Reg
G61
#4
DRAFT
LX12

DRAFT
ENVIRONMENTAL IMPACT REPORT

sausalito ferry terminal

Golden Gate Bridge, Highway and Transportation District

GOLDEN GATE BRIDGE, HIGHWAY AND TRANSPORTATION DISTRICT

DALE W. LUEHRING
GENERAL MANAGER

July 12, 1974

Gentlemen:

In accordance with the provisions of the "Amended Local Guidelines of the Golden Gate Bridge, Highway and Transportation District Implementing the California Environmental Quality Act, as Amended," we enclose a copy of the Draft Environmental Impact Report (EIR) covering a proposed passenger terminal area for ticketing/sales/waiting and boarding, and a berthing location for a ferry vessel, and the relocation of the temporary landing float within 100 feet of the existing mooring site during construction at Sausalito, California.

The Board of Directors for the District approved the distribution of the Draft EIR and authorized a July 12, 1974 "Notice of Intent" to be filed with the State Clearinghouse. The Board set the date for receipt of comments by public agencies and others as August 22, 1974. We would appreciate your reviewing the Draft EIR and forwarding your comments to us at the below address by August 22.

Sincerely,

Dale W. Luehring
General Manager

DWL:ls

Enc.

BOX 9000 PRESIDIO STATION • SAN FRANCISCO CALIFORNIA 94129 • TELEPHONE 546 5858

SAN FRANCISCO PUBLIC LIBRARY
3 1223 04181 0582

DRAFT
ENVIRONMENTAL IMPACT REPORT
# of the
SAUSALITO FERRY TERMINAL

Sponsor: Golden Gate Bridge, Highway, and
Transportation District

July 1974

Prepared by

WILSEY & HAM
Planning & Engineering
1035 East Hillsdale Boulevard
Foster City, California 94404

The preparation of this report has been financed in part through a grant from the United States Department of Transportation, Urban Mass Transportation Administration, under the Urban Mass Transportation Act of 1964, as amended.

NOTICE OF COMPLETION UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT IF A REVIEW IS REQUIRED AT THE STATE LEVEL ON THE ENVIRONMENTAL IMPACT REPORT OR NEGATIVE DECLARATION.

Office of the Governor
Office of Planning & Research
1400 - 10th St. - Rm. 121
Sacramento, CA 95814
(916) 445-0613

STATE OF CALIFORNIA
Form OPR-1 (4/74)

Sausalito EIR

STATE CLEARINGHOUSE NUMBER (SCH. NO) (1-8)

TRANSACTION (9)

SEE INSTRUCTIONS ON REVERSE SIDE

01 SPONSOR (OR AGENCY RESPONSIBLE FOR REPORT) (12-45) G G B H T D | DIVISION (46-74) Engineering | DATE THIS FORM SUBMITTED (75-80) MO. 7 DAY 15 YEAR 74

02 PROJECT TITLE (12-71) Sausalito Ferry Terminal | AGENCY ACTION DATE (SEE INST) (75-80) MO. 8 DAY 22 YEAR 74

03 ADDRESS (12-45) Box 9000 Presidio Station | CITY (46-60) San Francisco | COUNTY (61-75) San Francisco | ZIP CODE (76-81) 94129

04 CONTACT PERSON (12-36) Harry D. Reilich | TITLE (37-65) District Engineer | AREA CODE (66-68) 415 | PHONE (69-75) 346-5858 | EXT. (76-80)

PROJECT DESCRIPTION OF NATURE, PURPOSE, BENEFICIARIES

05 (12-71) Construction of a Passenger Terminal Area for Ticketing
06 (12-71) Sales/waiting and Boarding, and a Berthing location for a Ferry
07 (12-71) Vessel, and the relocation of the temporary landing float
08 (12-71) within 100 feet of the existing mooring site during construction
09 (12-71) at Sausalito, California
10 (12-71)

ON THESE 6 LINES CAPSULIZE THE PROJECT DESCRIPTION. YOU ARE ENCOURAGED TO ATTACH ADDITIONAL INFORMATION ON THE PROJECT FOR THE BENEFIT OF THE REVIEWER. IF YOU DO, THE STATE CLEARINGHOUSE WILL NEED 25 COPIES OF ANY ATTACHMENTS. PLEASE CHECK WITH THE METROPOLITAN CLEARINGHOUSE FOR THEIR SUBMISSION REQUIREMENTS.

11 PROJECT LOCATION CITY (12-45) Sausalito | PROJECT LOCATION COUNTY (46-79) Marin

12

FEDERAL FUNDS		MATCHING FUNDS		(48-56) OTHER NON-FEDERAL FUNDS	(57-66) TOTAL FUNDS
GRANT (12-20)	OTHER (21-29)	STATE (30-38)	LOCAL (39-47)		
1,399,333	X	X	617,667		2,017,000

13 SOURCE OF OTHER FEDERAL FUNDS (12-34) -- | FED. CATALOG NO. | SOURCE OF STATE MATCH (35-57) --- | SOURCE OF OTHER NON-FED. FUNDS (58-80) G G B H T D

14 FUNDING AGENCY PROGRAM TITLE (12-80) Urban Mass Transportation Act of 1964 | FEDERAL CATALOG NUMBER 20.500

15 FUNDING AGENCY NAME (12-45) Department of Transportation | SUB-AGENCY (46-79) Urban Mass Transportation Administration

16

CONGRESSIONAL DISTRICT						SENATE DISTRICT					ASSEMBLY DISTRICT									STATE-WIDE		COUNTY-WIDE		MULTI-COUNTY	
12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	36-37	38-39	40-41	42-43	44-45	46-47	48-49	50-51	52 YES	53 NO	54 YES	55 NO	56 YES	57 NO
6						4					7									☐	☐	☐	☐	☐	☐

17 TYPE OF ACTION:

☒ 12 NEW
☐ 13 MODIFICATION IN CURRENT GRANT - CUR. SCH. NO. ______ (14-21)
☐ 22 CONTINUATION GRANT SCH. NO. FROM PRE. YR. ______ (23-30)
☐ 31 RESUBMITTAL IF A PRE APPLICATION - PRE. SCH. NO. ______ (32-39)

REQUESTED FUND START (40-45) 7-1-74 MON - DAY - YEAR
FUNDS DURATION 16 MOS. (46-48)
EST. PROJECT START (49-54) ______ MON - DAY - YEAR
EST. PROJECT DURATION ______ MOS. (55-57)

PROJECT SUBJECT TO REVIEW UNDER:
(CHECK AS MANY AS APPROPRIATE)

☐ 58 U.S. OFFICE OF MANAGEMENT AND BUDGET CIRCULAR A-95
☐ 59 MODEL CITIES PLANNED VARIATION
☐ 60 NATIONAL ENVIRONMENTAL POLICY ACT
☒ 61 CALIFORNIA ENVIRONMENTAL QUALITY ACT
☐ 62 SUBDIVISION REVIEW (SECTION 11550.1 OF BUSINESS & PROFESSIONS CODE)
☐ 63 STATE ADMINISTRATIVE MANUAL (SEC. 0911)
☐ 64 HEALTH RELATED (SEC. 437.5 OF HEALTH AND SAFETY CODE)
☐ 65 LEASE OF STATE LANDS
☐ 66 OTHER: ______

IF PROJECT IS PHYSICAL IN NATURE OR REQUIRES AN ENVIRONMENTAL DOCUMENT, LIST THE U.S. GEOLOGICAL SURVEY QUADRANGLE MAP IN WHICH THE PROJECT IS LOCATED.

1. San Francisco, North
2.
3.
4.
5.

DOES YOUR AGENCY HAVE A CIVIL RIGHTS AFFIRMATIVE ACTION POLICY AND PLAN?

YES ☒ 67 NO ☐ 68

WILL THE PROJECT REQUIRE RELOCATION?

YES ☐ 69 NO ☒ 70

18 IS ENVIRONMENTAL DOCUMENT REVIEW REQUIRED? YES ☒ 12 NO ☐ 13

IF YES -
☒ 14 ENVIRONMENTAL IMPACT STATEMENT (REPORT) ATTACHED
☐ 15 DRAFT EIR ☐ 16 FINAL EIR
☐ 17 NEGATIVE DECLARATION ATTACHED
☐ 18 NONE ATTACHED - DOCUMENT WILL BE FORWARDED ON APPROXIMATELY ______ MON DAY YEAR (19-24)

IF NO -
☒ 25 FEDERAL PROGRAM DOES NOT REQUIRE AN ENVIRONMENTAL DOCUMENT
☐ 26 PROJECT EXEMPT UNDER STATE CATEGORICAL EXEMPTION, CLASS ______ (27-28)

19 LIST LOCAL, COUNTYWIDE, REGIONAL, STATE OR FEDERAL AGENCIES WITH WHICH COORDINATION HAS BEEN ESTABLISHED.

City of Sausalito; County Planning Commission; County Flood Control and Water Conservation District; State Resource Agency; U. S. Dept. of Transportation; and U. S. Dept. of the Army

SPONSOR'S PROJECT I.D. NUMBER (OPTIONAL) (12-21)

H. D. Reilich
SIGNATURE OF AUTHORIZED REPRESENTATIVE

SAN FRANCISCO PUBLIC LIBRARY
3 1223 04181 0582

DRAFT

ENVIRONMENTAL IMPACT REPORT
# of the
SAUSALITO FERRY TERMINAL

Sponsor: Golden Gate Bridge, Highway, and
Transportation District

July 1974

Prepared by

WILSEY & HAM
Planning & Engineering
1035 East Hillsdale Boulevard
Foster City, California 94404

The preparation of this report has been financed in part through a grant from the United States Department of Transportation, Urban Mass Transportation Administration, under the Urban Mass Transportation Act of 1964, as amended.

D REF 386.6097 D783

Draft environmental
impact report of the
1974.

3 1223 04181 0582

S.F. PUBLIC LIBRARY

Preface

PREFACE

Any project affects the surrounding physical, biological, economic, and human environments. The purpose of the Environmental Impact Report (EIR) is to investigate the nature and extent of these effects and to present them in a form which makes it possible for public officials and the citizenry to assess the impacts and to evaluate alternatives for the project and its surrounding environment.

This Environmental Impact Report has been prepared to provide sufficient information to enable evaluations of the environmental factors which could be affected by the project. All background data used in assessing the impacts are either contained in the report or sufficiently referenced to enable the reader to retrace the assessment process.

The contents of this Draft Environmental Impact Report are in compliance with the "Guidelines for the Implementation of the California Environmental Quality Act of 1970, as amended", issued by the Resources Agency of California on December 17, 1973, and the "Local Guidelines of the Golden Gate Bridge, Highway and Transportation District implementing the California Environmental Quality Act of 1970, as amended".

Parenthetical footnote references used in the text refer the reader to entries in the Bibliography. The format of parenthetical footnotes is as follows: (Author, publication date, page.) When there is more than one reference by the same author and year, a lower-case letter is entered after the document publication date in both the footnote and the bibliography entry.

Executive
Summary

EXECUTIVE SUMMARY

The Golden Gate Bridge, Highway and Transportation District is proposing a permanent ferry terminal at Sausalito, at the location of the present temporary terminal which is now accommodating service by the ferry M.V. Golden Gate. A temporary terminal which will accommodate the upper-deck loading Spaulding 165 vessels will be completed prior to the permanent facility, and will be used while the latter is under construction. Expanded San Francisco-Sausalito ferry service with the new vessels will be part of an integrated bus-ferry system whose primary ferry component will be at Larkspur, where a new terminal is also being developed.

Evaluation of the environmental impact of the terminal project was based on the assumption that ridership would be equal to capacity of the new service. This was done to project the maximum potential impact of the project. Actual ridership, and resulting impacts on transportation, air quality, and economic factors are likely to be somewhat lower than those described in the body of this report.

On the whole, adverse impacts of the project are found to be limited to certain local factors mentioned below, while the potential regional benefits of providing alternatives to automobile usage are high.

There are no major natural environmental impacts that would result from the project. Some local increase in air pollution as a result of vehicular traffic related to the ferries would result; but on a regional basis, the project would lower regional air pollution emissions because of overall reduction in total vehicle-miles traveled. Biological and geological impacts are considered slight.

Adverse impacts to the social, economic, and man-made environment include possible conflicts with policies of the Marin Municipal Water District restricting increased water usage, required for the expanded ferry service. The MMWD ordinance restricting new water service is currently a subject of legal action. Its final effect on Bridge District plans is unclear at this time and alternate sources of water are possible.

A second socioeconomic impact is the conflict in policies between the City of Sausalito and the Bridge District. The City's concerns are involved with protecting what it sees as small-town characteristics from the pressure of increased visitors, while the Bridge District's goals are balanced transportation opportunities on a regional level. This is related to the third area of impact, transportation, where local increases of pedestrian traffic on weekends and vehicular traffic on weekdays in Sausalito generated by the ferry service is considered an adverse impact. Again, regional concerns for providing alternative transportation facilities in the Golden Gate Corridor are balanced against adverse local impact.

Mitigation measures described to minimize adverse impacts include alternative sources of water because of MMWD restrictions, the exercise of jurisdiction by the Bridge District to carry out the project if policy conflicts with the City of Sausalito are not solved, and the continuing use of a parking area leased by the Bridge District in North Sausalito to shuttle passengers to the ferry, reducing ferry-related traffic on downtown Bridgeway, to minimize local traffic impact.

Contents

CONTENTS

PAGE

PREFACE

EXECUTIVE SUMMARY

1.0.0 PROJECT DESCRIPTION 1- 1

1.1.0 SUMMARY 1- 1
1.2.0 SETTING 1- 2
1.3.0 THE SAUSALITO FERRY TERMINAL 1- 4
1.4.0 OPERATIONAL CHARACTERISTICS 1- 5
1.5.0 TIMING AND PHASING 1-11
1.6.0 RELATIONSHIP OF THE PROJECT TO OTHER PROJECTS 1-12

2.0.0 NATURAL ENVIRONMENTAL SETTING 2- 1

2.1.0 ATMOSPHERIC CONDITIONS 2- 1
2.2.0 BIOTIC CONDITIONS 2- 4
2.3.0 GEOLOGIC CONDITIONS 2- 6
2.4.0 HYDROLOGICAL CONDITIONS 2-11
2.5.0 ACOUSTICAL CONDITIONS 2-12
2.6.0 VISUAL CONDITIONS 2-14

3.0.0 SOCIAL, ECONOMIC AND MAN-MADE ENVIRONMENT 3- 1

3.1.0 GOVERNMENT POLICIES 3- 1
3.2.0 IMPROVEMENTS 3- 9
3.3.0 PUBLIC UTILITIES 3-10
3.4.0 EXISTING TRANSPORTATION ENVIRONMENT 3-13
3.5.0 ECONOMIC ACTIVITY AND EMPLOYMENT 3-16
3.6.0 POPULATION 3-26
3.7.0 HOUSING 3-28
3.8.0 HISTORICAL AND ARCHAEOLOGICAL FEATURES 3-30

4.0.0 IMPACTS ON THE NATURAL ENVIRONMENT 4- 1

4.1.0 ATMOSPHERIC AND CLIMATIC IMPACT 4- 1
4.2.0 BIOLOGICAL IMPACT 4- 7
4.3.0 GEOLOGIC AND SOILS IMPACT 4- 9
4.4.0 HYDROLOGIC IMPACT 4-11
4.5.0 ACOUSTIC IMPACT 4-12
4.6.0 VISUAL IMPACT 4-14
4.7.0 IMPACTS OF TEMPORARY TERMINAL 4-15

CONTENTS

PAGE

5.0.0 IMPACT ON SOCIAL, ECONOMIC, AND MAN-MADE ENVIRONMENT 5- 1

5.1.0 GOVERNMENT POLICIES 5- 1
5.2.0 IMPROVEMENTS 5- 3
5.3.0 PUBLIC UTILITIES 5- 4
5.4.0 IMPACT ON THE TRANSPORTATION ENVIRONMENT 5- 7
5.5.0 ECONOMIC ACTIVITY AND EMPLOYMENT 5-12
5.6.0 POPULATION AND HOUSING 5-23
5.7.0 HISTORICAL AND ARCHAEOLOGICAL IMPACT 5-25
5.8.0 IMPACTS OF TEMPORARY TERMINAL 5-26

6.0.0 ANY ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSAL IS IMPLEMENTED 6- 1

6.1.0 ADVERSE IMPACTS TO THE NATURAL ENVIRONMENT 6- 1
6.2.0 ADVERSE IMPACTS TO THE SOCIAL, ECONOMIC, AND MAN-MADE ENVIRONMENT 6- 2

7.0.0 MITIGATION MEASURES PROPOSED TO MINIMIZE THE IMPACT 7- 1

7.1.0 MITIGATION MEASURES PROPOSED TO MINIMIZE THE IMPACT ON THE SOCIAL, ECONOMIC, AND MAN-MADE ENVIRONMENT 7- 1

8.0.0 ALTERNATIVES TO PROPOSED PROJECT 8- 1

8.1.0 LOCATIONAL ALTERNATIVE 8- 1
8.2.0 "NO PROJECT" ALTERNATIVE 8- 5
8.3.0 DESIGN ALTERNATIVES 8- 6

9.0.0 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY 9- 1

10.0.0 ANY IRREVERSIBLE ENVIRONMENTAL CHANGES WHICH WOULD BE INVOLVED IN THE PROPOSED PROJECT SHOULD IT BE IMPLEMENTED 10- 1

11.0.0 GROWTH INDUCING IMPACT 11- 1

CONTENTS

PAGE

12.0.0 SOURCES AND REFERENCES 12- 1

12.1.0 INDIVIDUALS CONTACTED 12- 1
12.2.0 BIBLIOGRAPHY 12- 2

13.0.0 APPENDICES

APPENDIX A: TABLES & EXHIBITS
APPENDIX B: CLIMATE AND AIR QUALITY REPORT
APPENDIX C: ECOLOGICAL SURVEY
APPENDIX D: GEOLOGIC AND SOILS REPORT
APPENDIX E: TRANSPORTATION REPORT
APPENDIX F: ECONOMICS REPORT

CREDITS

TABLES

SECTION 1

Number	Title	Appendix A	Page
1	Proposed Weekday Ferry Schedule (October Through May)		1-7
2	Proposed Weekday Sausalito Ferry Schedule (June Through September)		1-8
3	Proposed Weekend and Holiday Ferry Schedule (October Through May)		1-9
4	Proposed Weekend Sausalito Ferry Schedule (June Through September)		1-10

SECTION 2

5	Concentrations of Heavy Metals Sausalito Terminal Mud Samples		2-10
1	Tidal Data Sausalito	x	
6	Design Noise Level/Land Use Relationship		2-13

SECTION 3

2	Estimated Average Annual Employment and Percentage Distribution By Industry Nine-County San Francisco Bay Area 1960, 1966, 1970, 1971	x	
3	Percent of Nine-County San Francisco Bay Area Employment in Marin County By Industry 1960 and 1970	x	
4	Estimated Average Annual Employment By Industry Marin County 1960 and 1970	x	
7	Major Employers Located In Sausalito, 1974 (Establishments/Agencies Employing 50 or More Persons)		3-17
8	Retail Sales of Selected Types of Business of Various Marin County Cities as a percent Share of Total County Sales, 1973		3-20

TABLES

Number	Title	Appendix A	Page
9	Selected Retail Trade Statistics City of Sausalito 1963-1973		3-21
10	Retail Sales and Percent Change City of Sausalito and Marin County 1963-1973		3-22
5	Estimated Average Annual Employment and Unemployment San Francisco-Oakland Metropolitan Area 1963-1972	x	
6	Definitions	x	
7	Estimated Unemployment and Underutilized, Disadvantaged San Francisco-Oakland Metropolitan Area Fiscal Year 1973-1974	x	
8	Basic/Nonbasic Employment Marin County 1960 and 1970	x	
9	Income of Families and Unrelated Individuals Marin County 1969	x	
10	Income of Families and Unrelated Individuals City of Sausalito 1969	x	
11	Selected Socioeconomic Data Sausalito and Marin County 1970		3-25
11	Population - California and San Francisco Bay Area Counties 1960, 1966 and 1970	x	
12	Population of Cities in Marin County 1960 and 1970	x	

TABLES

Number	Title	Appendix A	Page
13	Population By Age and Sex Marin County 1970	x	
14	Estimated Population and Percent Increase Over Preceding Year Marin County July 1, 1963-1972	x	
15	Housing Characteristics Marin County April, 1970	x	
16	New Dwelling Units By Type of Structure Marin County 1962-1972	x	
17	New Dwelling Units and Permit Valuation City of Sausalito 1971, 1972, 1973	x	

SECTION 4

Number	Title	Appendix A	Page
12	Peak Hour Emissions From Ferries, Automobiles, and Buses In Sausalito		4-2
13	Computed Pollutant Concentrations (PPM) at Various Distances From Source During Peak Hour Traffic		4-5

SECTION 5

Number	Title	Appendix A	Page
14	Utility Demand Sausalito Ferry System		5-5
15	Summary of Weekday Peak Hour Impact January 1976		5-8
16	Summary of Weekend Peak Hour Impact January 1976		5-10
17	Hypothetical Weekday Ferry System Patronage, Maximum Load Sausalito Terminal		5-13

TABLES

Number	Title	Appendix A	Page
18	Hypothetical Weekend/Holiday Ferry System Patronage, Maximum Load Sausalito Terminal		5-15
19	Potential (Maximum) Nonresident Weekday Visitation to Sausalito at Various Ferry System Service Levels		5-17
20	Potential (Maximum) Nonresident Weekend/Holiday Visitation to Sausalito at Various Ferry System Service Levels		5-17
21	Maximum Ranges of Visitation to Sausalito, Various System Scheduling and Service Levels		5-18
22	Probable Annual Retail Sales Impact of Ferry System Operation on Sausalito at Maximum Ferry Patronage Levels		5-20
23	Visitor Expenditure Levels Translated Into Supportable Floor Area, Maximum Ferry System Patronage		5-21

FIGURES

Number	Title	Follows Page
SECTION 1		
1	Regional Setting	1- 2
2	Site Features	1- 2
3	Sausalito Ferry Terminal Plan	1-4
SECTION 2		
4	Existing Traffic Noise	2-12
5	M.V. Golden Gate Noise Output	2-12
SECTION 3		
6	Downtown Vehicular Circulation	3-13
SECTION 4		
7	Projected Noise Impact - Spaulding 165	4-12

1 SECTION 1.0.0
PROJECT DESCRIPTION

1.0.0 PROJECT DESCRIPTION

1.1.0 SUMMARY

The Golden Gate Bridge, Highway and Transportation District, to carry out policies of providing alternatives to automobile transportation in the Golden Gate Corridor, is developing an expanded passenger ferry system to link Marin County and San Francisco. Present service is provided by the 575-passenger-capacity M.V. Golden Gate, operating since 1970 between a temporary facility at Sausalito and a temporary facility just north of the Ferry Building in San Francisco.

The proposal is a permanent Sausalito ferry terminal at approximately the same location as the temporary one that would accommodate passenger ticket sales, waiting and boarding for the Spaulding 165 vessels that will be delivered to the Bridge District beginning in late 1974. The terminal will be able to dock either an S-165 or the M.V. Golden Gate, with provision for upper deck loading, as required. The M.V. Golden Gate presently loads at its lower deck, but will be modified for the new terminal. The S-165 vessels will have a 100- to 150-person capacity increase over the M.V. Golden Gate, depending upon final Coast Guard certification.

The Bridge District is also planning to construct a new temporary facility to accommodate the S-165 at the site of the present M.V. Golden Gate facility, and will relocate this new temporary terminal approximately 80 feet south while construction of the permanent terminal is completed, thus maintaining uninterrupted ferry service.

It should be noted that the Bridge District is also developing a ferry terminal at Corte Madera Creek in Larkspur, and that this terminal, rather than Sausalito, will have the major augmented service, with several S-165s operating from that location and with commuter parking and ship service facilities.

1.2.0 SETTING

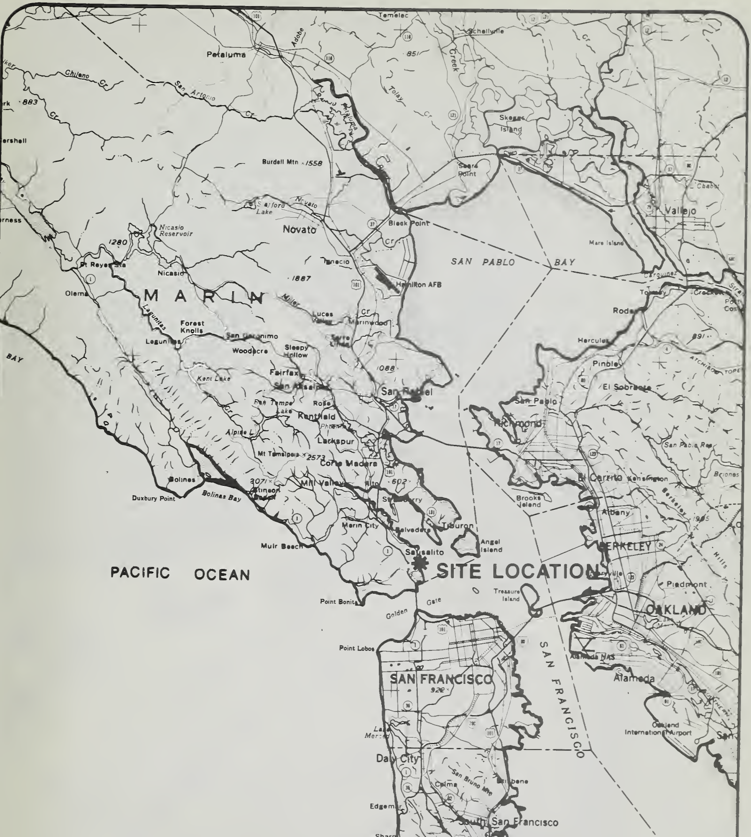
Sausalito is the southernmost urban area in Marin County and has been the location of a number of ferry services to San Francisco since the 19th Century. It is a predominantly residential community, although visitor- and local-oriented commercial activities are concentrated along Bridgeway, near the site of the proposed permanent ferry terminal. Other commercial activities and some marine-oriented industrial uses extend along Bridgeway for two miles north of downtown up to the Waldo Interchange with U.S. 101. See Figure 1, Regional Setting.

The immediate setting of the terminal is the Sausalito waterfront. Immediately to the west is Sausalito's Parking Lot No. 1; the Sausalito Yacht Club and the Sand Spit to the North; and the Bridgeway commercial area to the northwest and south. See Figure 2, Site Features.

The City of Sausalito itself is a small, critically situated community acting as one "port of entry" for visitors to Marin County from southern counties in the Bay Area. In its position as the first Marin settlement across the Golden Gate, it serves as (1) a residential location for people desiring this attractive location on San Francisco Bay; (2) a visitor center for Marin County; and (3) an important center of the Bay Area pleasure boating industry.

Today, Sausalito is facing a series of challenges to its traditional character. Regional growth tilting toward Marin County has generated enormous interest in Southern Marin, with Sausalito selected by developers as one of the prime "water-oriented locations" where new real estate development might occur. Concurrently, leisure-time visitation to Marin County by local and outside travelers has grown to a very significant level--and Sausalito is one of the county's most popular visitor destinations. Now, a third factor has emerged--that of Sausalito's role as a transportation transfer point.

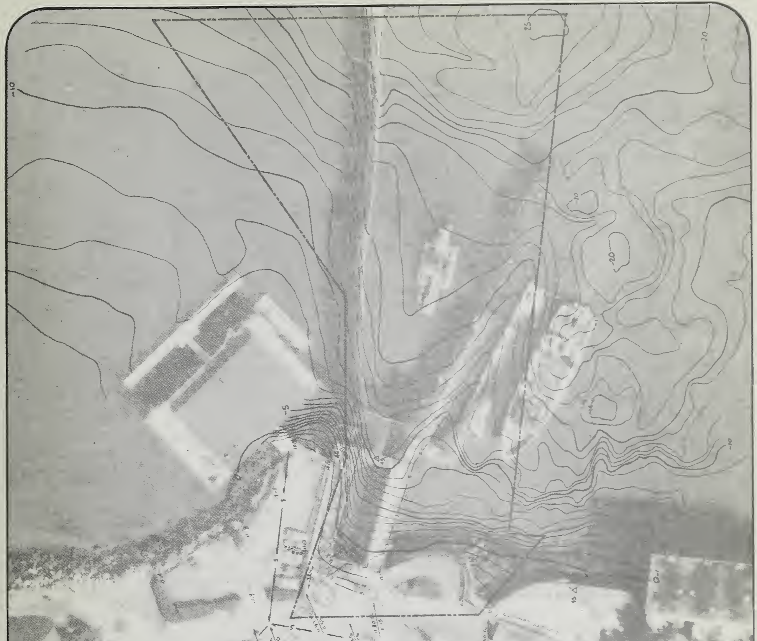
Sausalito is not large, as contemporary California settlements go. It has historically been limited in its territorial development by the very rugged nature of its surrounding topography. The Sausalito of today, in terms of geographic spread, is not significantly larger than the Sausalito of forty years ago--although much of its character has changed.



sausalito ferry terminal EIR
PREPARED BY:
Wilsey & Ham

REGIONAL SETTING

FIGURE 1



sausalito ferry terminal E I R

PREPARED BY:

Wilsey & Ham

SOURCE: Murray-McCormick Associates

SITE FEATURES

FIGURE 2

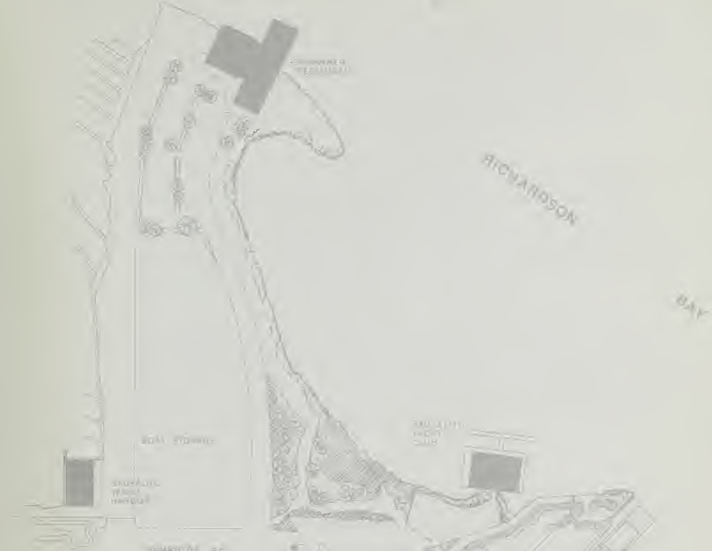
Two significant events have acted upon Sausalito in recent history. The first was completion of the Golden Gate Bridge in 1937. This opening of easy auto travel to relatively isolated Marin County changed forever Marin County and Sausalito's position in the Bay Region. The second event was the location of the Marinship yards in Sausalito in World War II. The location of this major employment generator brought about additional interest in the Sausalito vicinity as a place to live--or to occasionally visit after the yard itself was shut down. The shipyard development also reinforced the northern segment of Sausalito's waterfront as an alternate location of residential and commercial land uses.

Throughout its history, however, Sausalito has remained small, unique, and rather protected. Weekends, particularly summer, brought additional visitors to the area; large increases in Bay boating activity lined the waterfront with marinas; restaurants, shops, and a few new housing units were constructed. Over time, Sausalito has become quite saturated with visitors on weekends when traffic is heavy and parking difficult and expensive.

As traffic grew on the Bridge from 9,000 average daily traffic to over 90,000 daily in 1970, with concentration and congestion at peak commute and holiday periods, the Bridge District began to explore alternatives to automobile transit in the Golden Gate Corridor. Initial planning for taking over Greyhound bus commute service between Marin and San Francisco and inaugurating ferry service began, and in August, 1970 the M.V. Golden Gate inaugurated service between Sausalito and San Francisco with the Marin terminal at the present "temporary" float in Central Sausalito. In 1972, the Golden Gate Transit buses took over former Greyhound service. Sausalito's initial support of the present ferry service has recently been qualified by considerations of the expanded service planned by the Bridge District in the near future. The concerns being voiced include:

- Expansion of the Sausalito-San Francisco ferry service will affect the livability of the community because of added visitors arriving by ferry.

- Higher "commuter" usage of ferries will add to congestion in Sausalito at peak hours, whether commuters arrive or depart by feeder bus or private automobile.



NORTH

sausalito ferry terminal E I R
PREPARED BY:
Wilsey & Ham

SAUSALITO FERRY TERMINAL PLAN

SOURCE: Environmental Planning & Design Associates

FIGURE 3

1.4.0 OPERATIONAL CHARACTERISTICS

The operation of the ferry terminal and its resulting impacts will be a function of the scheduling and patronage of ferry service. While projections of schedules have been made by the Bridge District staff, it is also the position of the District staff that the number of vessels scheduled into either Sausalito or Larkspur will, to a large extent, be determined by the demand for that service.

The District's ferry transit plan emphasizes that central Marin (Larkspur) would have much higher commuter loads than Sausalito. The latest estimate (Madrone Associates, 1973) puts daily commuter patronage at 3200 for Larkspur and 630 for Sausalito. Thus, available capacity will be concentrated at Larkspur for commute periods, and the service to Sausalito will be based on the M.V. Golden Gate or one Spaulding 165 (of the three to be delivered in 1974 and 1975).

The Sausalito ferry terminal will become the focus of an expanded multimodal transport operation. This will include bus-ferry transfer, kiss-and-ride, park-and-ride, as well as significant pedestrian and bicycle access. A shuttle bus service will connect to a parking area in North Sausalito. The intensity of these operations will be in direct proportion to the increased ferry patronage.

1.4.1 Weekday Peak Periods

The schedule for peak periods (6:00 to 10:00 a.m.; 4:00 to 7:00 p.m.) would not change through the year (Tables 1 and 2).

a. Minimum service would be three trips to San Francisco in the morning and three trips back to Sausalito in the evening. This service would consist solely of the M.V. Golden Gate.

   The Larkspur Terminal will handle eight S-165 runs to San Francisco in the morning commute hours and eight runs back in the evening commute hours.

b. Maximum service would be to transfer one run from Larkspur to Sausalito, giving Sausalito four trips during each commute period.

1.4.2 Off-Peak Weekdays

This would be the period from 10:00 a.m. to 4:00 p.m. and the period after 7:00 p.m. on weekdays.

a. Minimum service would be anticipated from October through May and would most likely consist of one vessel operating basically on the existing M.V. Golden Gate schedule (Table 1). Depending upon the circumstances at the time, the vessel could be either the M.V. Golden Gate or an S-165.

b. Maximum service would extend from June through September with two vessels operating on 45 minute headways (Table 2). The vessels could be the M.V. Golden Gate and one S-165 or two S-165s.

1.4.3 Saturdays, Sundays, and Holidays

a. Minimum service again should be expected from October through May with one S-165 operating essentially on the present M.V. Golden Gate schedule (Table 3). Over holiday weekends which fall during the minimum service months, two vessels operating on approximately one hour headways would be anticipated.

b. Maximum service would be scheduled from June through September with two S-165s operating on 45-minute headways (Table 4).

Ferry schedules that reflect these characteristics are shown below. These are subject to revision as the system develops.

1.4.4 Temporary Facility Operations

It is the stated policy of the Bridge District (see Exhibit 1) that levels of service at the temporary facility "will be maintained to present level during period of use of the temporary facility" and "Capacity of vessels will be limited to 596 persons."

Thus, the same schedule and vessel capacity will be maintained with the S-165 at the temporary facility as is presently provided by the M.V. Golden Gate.

TABLE 1

PROPOSED WEEKDAY FERRY SCHEDULE[1/]
OCTOBER THROUGH MAY

SAUSALITO LV.	SAN FRANCISCO ARR.	SAN FRANCISCO LV.	SAUSALITO ARR.
7:15 a.m.	7.45 a.m.	7.50 a.m.	8:20 a.m.
8:25	8:55	9:05	9:35
9:45	10:15	10:25	10:55
11:05	11:35	11:45	12:15 p.m.
12:25 p.m.	12:55 p.m.	1:10 p.m.	1:40
2:00	2:30	2:45	3:15
3:25	3:55	4:10	4:40
4:45	5:15	5:30	6:00
6:10	6:40	6:50	7:20
7:30	8:00	8:10	8:40
8:50	9:20	9:30	10:00

[1/] This is also the present M.V. Golden Gate weekday schedule, but could be operated with either M.V. Golden Gate or S-165.

Source: GGBHTD, May 1974.

TABLE 2

PROPOSED WEEKDAY SAUSALITO FERRY SCHEDULE
(JUNE THROUGH SEPTEMBER)

SAUSALITO LV.	SAN FRANCISCO ARR.	SAN FRANCISCO LV.	SAUSALITO ARR.
7:15 a.m.	7:45 a.m.	7:50 a.m.	8:20 a.m.
8:25	8:55	9:05	9:35
9:45	10:15	10:25	10:55
10:15*	10:45*	11:00*	11:30*
11:00	11:30	11:45	12:15 p.m.
11:45*	12:15 p.m.*	12:30 p.m.*	1:00*
12:30 p.m.	1:00	1:15	1:45
1:15*	1:45*	2:00*	2:30*
2:00	2:30	2:45	3:15
2:45*	3:15*	3:30*	4:00*
3:30	4:00	4:10	4:40
4:45	5:15	5:30	6:00
6:10	6:40	6:50	7:20
7:30	8:00	8:10	8:40
8:50	9:20	9:25	9:55

---

*Operations conducted by a second ferry.

Source: GGBHTD, April 1974.

TABLE 3

PROPOSED WEEKEND AND HOLIDAY FERRY SCHEDULE
(OCTOBER THROUGH MAY)[1]

SAUSALITO LV.	SAN FRANCISCO ARR.	SAN FRANCISCO LV.	SAUSALITO ARR.
9:45 a.m.	10:10 a.m.	10:20 a.m.	10:45 a.m.
10:55	11:20	11:30	11:55
12:05 p.m.	12:30 p.m.	12:40 p.m.	1:05 p.m.
1:15	1:40	1:50	2:15
2:25	2:50	3:00	3:25
3:35	4:00	4:10	4:35
4:45	5:10	5:20	5:45
5:55	6:20	6:30	6:55
7:05	7:30	7:40	8:05

---

[1] Operated with S-165 vessel.

Source: GGBHTD, May 1974

TABLE 4

PROPOSED WEEKEND SAUSALITO FERRY SCHEDULE
(JUNE THROUGH SEPTEMBER)

SAUSALITO LV.	SAN FRANCISCO ARR.	SAN FRANCISCO LV.	SAUSALITO ARR.
9:45 a.m.	10:15 a.m.	10:30 a.m.	11:00 a.m.
10:30	11:00*	11:15*	11:45*
11:15	11:45	12:00 p.m.	12:30 p.m.
		12:45*	1:15*
12:45	1:15	1:30	2:00
1:30*	2:00*	2:15*	2:45*
2:15	2:45	3:00	3:30
3:00*	3:30*	3:45*	4:15*
3:45	4:15	4:30	5:00
4:30*	5:00*	5:15*	5:45*
5:15	5:45	6:00	6:30
6:45	7:15	7:30	8:00
8:15	8:45	9:00	9:30

---

*Operations conducted by a second ferry.

Source: GGBHTD, April 1974.

1.5.0 TIMING AND PHASING

Because the Bridge District expects to take delivery of the first of three S-165 ferries by late 1974, plans are being developed and processed for temporary facility to function with the upper deck loading new vessel and the M.V. Golden Gate modified for upper deck boarding. A Negative Declaration regarding the environmental impact of this temporary facility was approved by the Bridge District Board of Directors on May 31, 1974. This facility would be operational by late 1974.

This temporary facility would be positioned at the same location as the existing ferry terminal, but would be moved approximately 80 feet south when construction of the permanent facility commences, thus maintaining ongoing ferry service.

The permanent terminal which is the subject of this EIR is expected to be in the plans and specifications stage by the end of 1974, and operational by mid-1975.

Concurrently, development of the Larkspur Ferry Terminal is expected to be completed by 1976.

1.6.0 RELATIONSHIP OF THE PROJECT TO OTHER PROJECTS

The Bridge District is developing a ferry terminal at a site on Corte Madera Creek in the City of Larkspur, east of the intersection of U.S. 101 and Sir Francis Drake Boulevard. Construction should be completed by early 1976. The terminal will serve the new Spaulding ferries and will have more peak-hour service than the Sausalito (see Section 1.4.0) network. The Larkspur terminal will have maintenance, service, and fueling facilities for the new ferries.

According to the environmental impact report on the Larkspur ferry terminal (Madrone Associates, 1973), an estimated 3200 passengers at peak hours would use this facility in 1975. It is assumed that the passengers would generally reside in Marin County communities north of Corte Madera Ridge, while the service area for the Sausalito ferry would be south of this boundary.

2 SECTION 2.0.0
NATURAL ENVIRONMENTAL SETTING

2.0.0 NATURAL ENVIRONMENTAL SETTING

2.1.0 ATMOSPHERIC CONDITIONS

This section is based on a report included in Appendix B, by Albert Miller, Ph.D., consulting meteorologist.

2.1.1 Climate

The climatic setting of the area must be considered in evaluating the changes that might be caused by a development as well as the levels of air pollution that might be produced. The dominant factor that determines the climates of the entire San Francisco Bay Area is its proximity to the Pacific Ocean. The large-scale flow of air is such that its path is almost invariably from the ocean. This maritime influence, which tempers the climate, falls off sharply with distance from the ocean and bay waters.

To illustrate, the mean monthly temperature over the Farallon Islands ranges between 51 degrees F. in January and 55 degrees F. in October; in San Francisco, the mean temperature ranges between 51 degrees F. and 62 degrees F (Table 2 of Appendix B); while at Hamilton Air Force Base, 46 degrees F. to 66 degrees F. The annual temperature range at Sausalito is a little greater than that at San Francisco - between 50 degrees F. and 62 degrees F.

The coastal hills to the west and northwest of Sausalito play an important role in channeling the air flow and thus the climate of the area. During the summer half of the year, May through October, when there are few storms and the flow along the Pacific coastline is almost invariably from the northwest, much of the marine air reaches Sausalito via the Golden Gate, rather than directly from the coast. During the morning until late afternoon, this flow of air from the Golden Gate increases and typically is from the southwest or south-southwest at Sausalito, and is replaced by a weak reverse flow after nightfall.

During the winter months, November to March, the daily wind cycle is not nearly as regular. When storms are approaching, the winds are typically from the south-southwest to south-southeast sector and, as the storms pass, turn to northwest.

Although the average wind speed is a little less in winter than in summer, the strongest peak speeds occur in winter during the passage of storms. Very weak winds and calm occur with a very high frequency in the fall and winter months in the intervals between storms. Thus, in winter, moderate wind speeds, associated with storms, are interspersed with periods of several days of very weak winds.

Atmospheric dispersion in this region is normally quite good, but poor dispersion conditions exist primarily from December to February.

Although vertical temperature soundings are not available for Sausalito, data available for Oakland, San Francisco and Mt. Tamalpais, plus occasional aircraft soundings imply that it is likely that ground level temperature inversions are not frequent at Sausalito.

2.1.2 Air Quality

The atmospheric circulation described in Section 2.1.0 plays a very important role in air pollution since it determines the rate at which man-made contaminants are dispersed. During certain periods, particularly in the fall and winter, the atmospheric conditions sometimes produce a high pollution potential.

Table 4 of Appendix B gives the air quality standards for contaminants produced from automobile emissions. There is no air pollution sampling station close to Sausalito, but inferences can be drawn from the stations located at San Rafael and San Francisco.

Table 4, Appendix B, also summarizes the the incidence of high pollutant concentrations during the past four years at San Rafael and San Francisco, and Figure 2, Appendix B, gives the average monthly variation of high-hour concentrations during a four year period at San Rafael.

As can be seen from this figure, the high pollution months for carbon monoxide, oxides of nitrogen, and hydrocarbons are September to March, while the highs for oxidants occur between June and October. The difference in behavior between oxidants and the other species of contaminants is due to the fact that oxidants are formed from the other species and atmospheric oxygen under the action of sunlight, which is most intense during the summer. (For comparison purposes, the mean high-hour oxidant level at San Rafael is generally higher than that at San Francisco, which is generally the lowest in the San Francisco Bay Area.)

For other contaminants, e.g., CO and NO_2, San Francisco has considerably higher values than does San Rafael. These other species are highest when the dispersive power of the atmosphere is least. This occurs in winter, when there are many periods of weak winds and mixing in the vertical is least due to the frequent occurence of temperature inversions near the surface, particularly in the morning. Thus, the peak CO and NO_x concentration occurs in the winter

at about 8:00 a.m. and between 6:00 and 10:00 p.m.; these times coincide with the peak traffic and minimum capability of the atmosphere to disperse contaminants. Oxidants, on the other hand, reach their peak concentration near midday in summer and early fall.

In summary, the oxidant level at Sausalito should be about the same as that observed at San Francisco while the levels of other contaminants should be close to those observed at San Rafael.

The only existing significant pollution sources near Sausalito are highways, primarily U.S. 101 traffic. The source strength of this highway is given in Section 2 of Appendix B.

2.2.0 BIOTIC CONDITIONS

This section is based on a report, included in Appendix C, by Harvey, Hartesveldt, Heath and Stanley, ecological consultants.

2.2.1 General Conditions

Along the shores of San Francisco Bay salt marshes and mud flats are of prime concern as wildlife habitats. The site of the proposed permanent Sausalito Ferry Terminal is located almost entirely within the shallow and deep water habitats of the Bay.

(Shallow water is defined as water covered areas between mean lower low water (MLLW) and minus six feet and deep water as those areas below minus six feet.) The rocky (concrete blocks) shore pilings contribute diversity of substrate that enables a variety of specially adapted organisms to thrive. The ecological survey emphasized the benthic (bottom) organisms of the site and those immediately adjacent, but also considered fish, bird and plant life.

2.2.2 Benthic Biology

A survey of ten bottom samples (collected, examined and catalogued as described in detail in Appendix C) reveals no great differences between biota within the terminal site and near it.

Only the occurrences of a few unique individuals in one or two samples hint at minor differences. An example is the two sea pens (*Stylatula elongata*) found at station one, the only sample containing such organisms. Nereid worms, nematodes, amphipods and mussels were commonly found in both areas. Thus, the region seems to have a moderate population exemplary of those portions of the Bay that are not especially rich or poor in benthic organisms. Due to the constraints of time, and probable seasonal differences, the sampling should be considered a limited assessment. However, other studies in the Bay indicate that both the species present and the relative abundance of each species vary during the year for a given site.

2.2.3 Fish

The pilings of the old ferry slip provide a substrate for a variety of invertebrates and algae that serve as food for a favorite food fish, the pile perch (*Racochilus vacca*). The rubber lips perch (*Racochilus toxotes*) and the starry flounder (*Platichthys stellatus*) were also reported caught regularly by fishermen interviewed at the terminal site. There are about ten to fifteen additional species of fish that undoubtedly occur in the waters of the site and a few are occasionally caught such as the bullhead or staghorn sculpin (*Leptocottus armatus*).

The site is within the known range of spawning area of the Pacific herring, consistent with the rocky shoreline profile.

2.2.4 Birds

The site provides some usable habitat for bird species such as gulls and waterfowl, but it is in a portion of the Bay that is rated only fair as a wildlife habitat. There are no marsh plants in the immediate region so the endangered clapper rail is not present nor are there suitable sites for least terns, the other endangered bird species of the Bay Region.

Because of the small size and few habitats of the project area and high human activity, the species and numbers of birds in the area are limited.

2.2.5 Plants

Although not profuse in their growth, marine algae cover the rocky shoreline pilings and were dredged up from the bottom during sampling for the benthic animals. All three major groups, green, red, and brown algae are present. Typical small, rock-covering forms such as sea lettuce and rockweeds were noted and microscopic examination would undoubtedly yield various species of blue-green algae and diatoms as well.

The site is within the known range of spawning area of the Pacific herring, consistent with the rocky shoreline profile.

2.2.4 Birds

The site provides some usable habitat for bird species such as gulls and waterfowl, but it is in a portion of the Bay that is rated only fair as a wildlife habitat. There are no marsh plants in the immediate region so the endangered clapper rail is not present nor are there suitable sites for least terns, the other endangered bird species of the Bay Region.

Because of the small size and few habitats of the project area and high human activity, the species and numbers of birds in the area are limited.

2.2.5 Plants

Although not profuse in their growth, marine algae cover the rocky shoreline pilings and were dredged up from the bottom during sampling for the benthic animals. All three major groups, green, red, and brown algae are present. Typical small, rock-covering forms such as sea lettuce and rockweeds were noted and microscopic examination would undoubtedly yield various species of blue-green algae and diatoms as well.

2.3.0 GEOLOGIC AND SOILS CONDITIONS

This section is based on a report by Cooper-Clark and Associates, engineering geologists. The complete report is included in Appendix D.

2.3.1 Topography

The landward portion of the site consists of filled land, which serves as a paved parking area, retained by a pile-supported bulkhead. Available records indicate that the fill and bulkhead were constructed in 1894. The presently existing topography is shown by contour lines on spot elevations on the seaward edge of the filled land, range from 10.5 to 12.2 feet mean lower low water (MLLW). Underwater contours at the maximum water depth, show that the mud surface is elevation -25 feet (MLLW) within the mapped area, with the average elevation approximately -15 feet (MLLW).

2.3.2 Regional Geology

The bedrock assemblage of the site and surrounding region consists of Franciscan Formation rocks (approximately 90 to 150 million years old), as shown on Plate A-2, Appendix D, Regional Geologic Map. In past geologic time, this general region has undergone repeated episodes of uplift, folding, and faulting.

San Francisco Bay is a "drowned valley" flooded by meltwater from the last continental glacier approximately 10,000 years ago. Shoreline features of San Francisco Bay are in a geologically youthful stage of erosional development. A similar situation exists where new reservoirs are constructed and a shoreline is created along the sides of previously sloping ground. It takes a number of years for erosion to cut a niche in this newly formed shoreline. This situation is especially true in Marin County, where precipitous cliffs dot the coastline due to the durable nature of Franciscan Assemblage rocks.

Franciscan rocks are strongly folded, closely jointed, and, in many places, cut by discontinuous fractures or faults and shear zones; these are generally old geologic features and result from intense folding and tectonic deformation.

The various rock types existing in the vicinity of the proposed terminal site are shown on Plate A-2, of Appendix D.

2.3.3 Site Geology

The predominant bedrock type exposed west of the site is chert. This hard silicous rock, though highly folded and fractured, resists weathering and stands out as peaks in excess of 1,000 feet elevation only a few miles west of the site. A softer sandstone and shale is in contact with the chert just landward of the site. The sandstone and shale underlie the site, based on data from 8 borings, at various depths ranging from 25 feet to 65 feet below the ground surface. This bedrock formation is overlain by unconsolidated sediments and soft bay mud. A rubble fill has been placed over portions of the site and ranges up to 28 feet in thickness.

There are no evident faults in the immediate vicinity of the proposed terminal. However, the coastline and bathymetric (underwater) topography, south of the site, exhibits a lineation suggestive of a possible offshore fault. A portion of this probable fault may be seen cutting through the rocks at Yellow Bluff, approximately 1-1/2 miles south of the site.

2.3.4 Seismology

The site's location with respect to major active or potentially-active faults is indicated on Plate A-3 of Appendix D, Epicenters of Major Histroic Earthquakes and Active, Potentially-Active Faults in the San Francisco Bay Area. Strong, destructive earthquakes have originated on the San Andreas, Hayward and Calaveras Faults, and major seismic events on these faults have shaken the site in the past. Monitoring of earthquakes with a Richter magnitude greater than 0.5 during the period 1969 through 1971 indicates that the Marin Peninsula was totally free of seismic events during this interval of time.

A recent seismic safety information map locates the site in an area that, in the last 164 years, has experienced between 11 and 15 earthquakes with apparent intensities ranging from VI to VIII. For reference, a scale of earthquake intensities is presented on Plate A-4, Appendix D, Modified Mercalli Intensity Scale.

During the 1906 earthquake, several north-south cracks reportedly developed in the fill in the general area of the Ferry Terminal. The fill was probably underlain by soft bay mud. However, the bulkhead wall reportedly was not damaged by this great earthquake, and the filled ground generally retained its integrity.

On March 22, 1957 the strongest earthquake since 1906 struck the area. The epicenter of this earthquake, which had a Richter Magnitude of 5.3, was located near Mussel Rock, about 13 miles southwest of the site. This earthquake, which was followed by 45 lesser tremors in the next few days, caused moderate structural damage in the immediate vicinity of the proposed ferry terminal. However, the bulkhead and retained fill did not suffer any visible damage. The isoseismal map of the 1957 earthquake shows the terminal site to lie within an area where the apparent intensity was VI.

A recent study indicates that the site could be subject to a tsunami (earthquake-induced sea wave). In 1964, a tsunami generated by the Alaskan earthquake of March 28, had a recorded wave height of 7.4 feet at the Presidio tide gauge. It is believed that bathymetry and friction would reduce this wave height by 25 percent before it reached the terminal site. Therefore, if one assumes a maximum 7-foot-high seismically-inducted water wave (MLLW) at maximum high tide, the elevation flooded by such a seismic water wave would be 12.6 feet (MLLW). The highest potential tsunami wave height has been estimated at 20 feet at the Golden Gate Bridge, or 15 feet at the proposed site. It is estimated that such a wave would occur on a frequency of once every 200 years.

A seiche or unusually large water wave formed within the Bay can also be generated by a local seismic event, as well as by a landslide, and changes in atmospheric pressure or unusually strong winds combined with high tides.

2.3.5 Soil Conditions

Subsurface conditions were explored by drilling two borings on land and six borings under water with a rotary wash-type drillings rig. The boring locations are shown on the Plot Plan, Plate A-1 of Appendix D.

At the on-land boring locations, the site is blanketed by from 26 to 28 feet of fill composed of broken rock and concrete fragments mixed with bay mud and debris. Individual clasts within the fill range from clay to boulder size. Below the fill and below the mud line under water, the site is underlain by soft bay mud ranging up to 40 feet in thickness. This soft bay mud is generally underlain either by medium loose to medium dense broken chert, with individual dimensions up to cobble size, or by sand deposits 3 to 10 feet thick, which are in turn underlain by 8 to 22 feet of stiff clayey soils. These unconsolidated deposits overlie hard, competent sandstone and shale bedrock.

Selected samples of bay mud were obtained at 1/2-, 3- and 6-foot depths at two locations at the proposed site. An analysis for detrimental heavy metals showed the following concentrations in milligrams per kilogram: (Table 5).

TABLE 5

CONCENTRATIONS OF HEAVY METALS, MILLIGRAMS PER KILOGRAM
SAUSALITO TERMINAL MUD SAMPLES

(depth in feet)	Mercury	Lead	Copper	Zinc	Cadmium
SITE 1					
0.5	0.27	2.5	33.0	85.5	1.0
3	0.35	0.5	43.0	89.0	0.5
6	0.35	0.5	35.5	75.0	1.5
SITE 2					
0.5	0.70	4.0	41.5	141.5	0.5
3	0.23	7.5	33.0	115.0	0.5
6	0.32	2.8	31.5	76.0	0.5

Note: The U. S. Environmental Protection Agency's maximum allowable concentrations of these heavy metals is 1 milligram per kilogram (mg/kg) for mercury, 50 mg/kg for lead and copper, 130 mg/kg for zinc and 2 mg/kg for cadmium.

Source: Cooper Clark & Associates

2.4.0 HYDROLOGICAL CONDITIONS

2.4.1 Surface Water

The ferry terminal site is located in downtown Sausalito and urbanization has modified the area's natural onshore drainage pattern. However, the natural watershed is small and contributes only a minimal amount of runoff water to this area.

2.4.2 Tidal Conditions

The hydrologic characteristics of the site are controlled by tidal fluctuation and currents; maximum tidal range is approximately 11 feet in this area. Table 1, Appendix A, presents tidal data interpolated for Sausalito from U.S. Coast and Geodetic Survey data.

2.5.0 ACOUSTICAL CONDITIONS

2.5.1 General Conditions

The acoustic environment of downtown Sausalito near the ferry terminal site is a function primarily of vehicle traffic and to a lesser extent, existing ferry operations. Unlike most communities, Sausalito experiences peak traffic periods during weekends, rather than weekday commute hour periods, and acoustical conditions described are oriented to this situation.

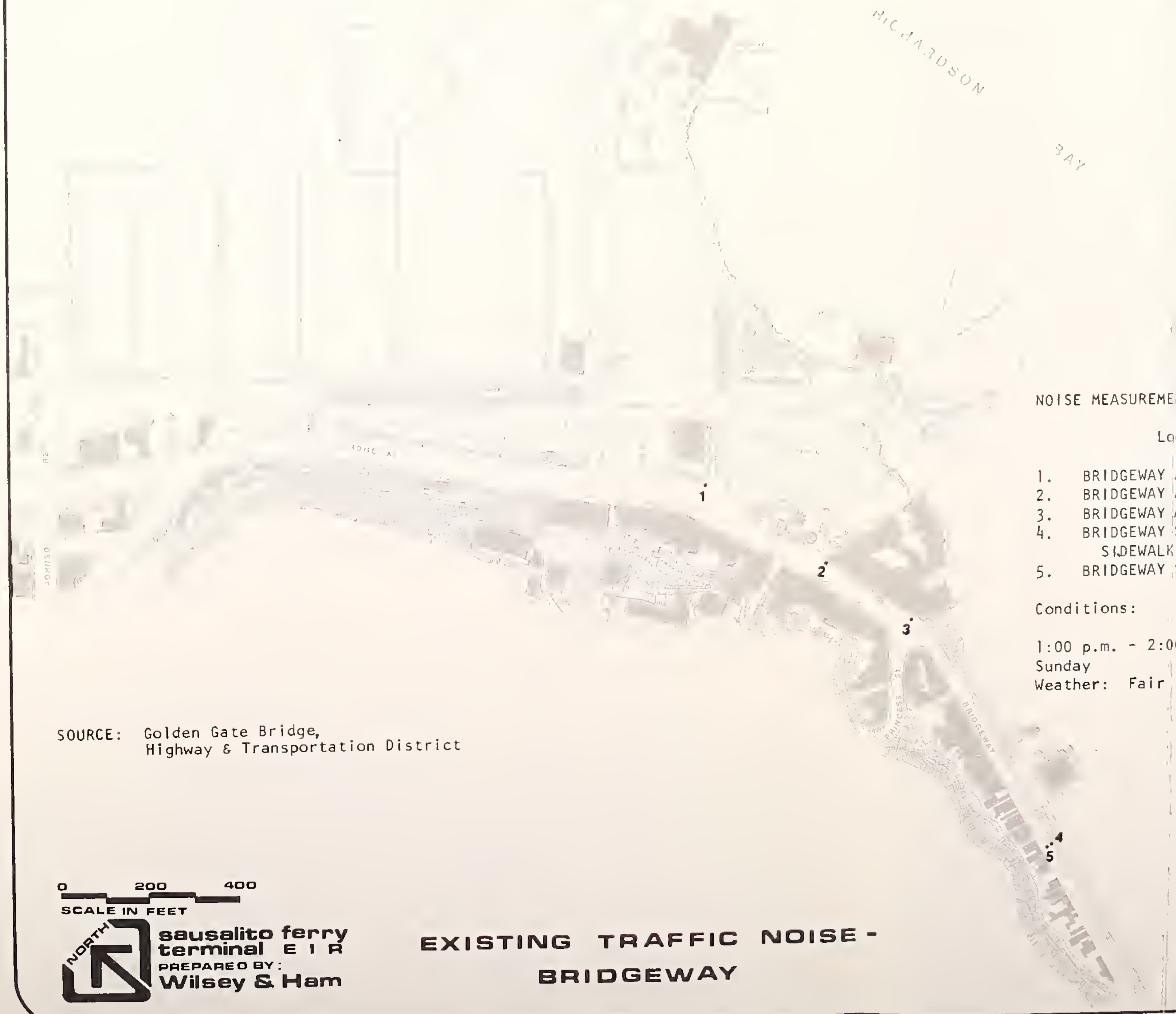
2.5.2 Traffic Noise

Traffic noise is directly proportional to volume of traffic but it is also affected by speed, proportion of trucks, grades and insulating effects of topography or buildings. Based on peak hour traffic, existing noise generated by Bridgeway Boulevard traffic in the vicinity of the ferry terminal is 50-55 dBA (decibels) at 100 feet, based on criteria published by the U.S. Department of Housing and Urban Development (U.S. Department of Housing and Urban Development, 1971, pp.155-156).

Actual noise level measurements were also made in Sausalito on a Sunday afternoon, normally a peak traffic time. The curbside readings of 65-75 dBA along Bridgeway are consistent with 50-55 dBA at 100 feet. See Figure 4. These levels are compatible with existing areas. See Table 6.

2.5.3 Ferry Operational Noise

The diesel-powered M.V. Golden Gate that provides existing ferry service emits noise levels in a 70-73 dBA at a 50 foot distance from the stack vent aft in the vessel. This is based on measurements taken by the Bridge District in May, 1974 as the ferry made arrival maneuvers, idling and departing. At 100 feet from the stack, at idle, 60 dBA was recorded. Ambient noise at the pier before the vessel approached was 50-55 dBA. See Figure 5.



NOISE MEASUREMENT POINTS

	Location	dBA
1.	BRIDGEWAY AT ANCHOR	65-73
2.	BRIDGEWAY AT EL PORTAL	68-75
3.	BRIDGEWAY AT PRINCESS	65-70
4.	BRIDGEWAY SOUTHEAST SIDEWALK	68-73
5.	BRIDGEWAY SOUTH - MEDIAN	70-73

Conditions:

1:00 p.m. - 2:00 p.m., May 5, 1974,
Sunday
Weather: Fair

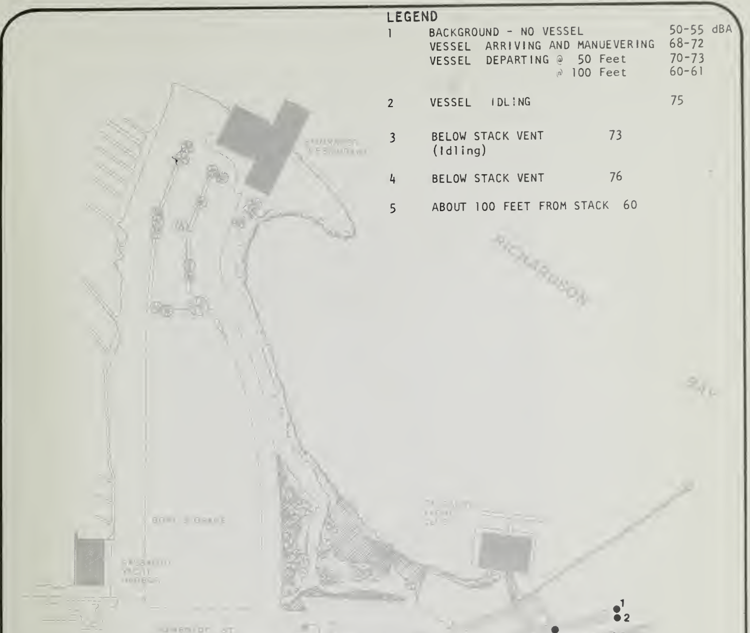
SOURCE: Golden Gate Bridge,
Highway & Transportation District

NORTH

sausalito ferry terminal EIR
PREPARED BY:
Wilsey & Ham

EXISTING TRAFFIC NOISE - BRIDGEWAY

FIGURE 4


LEGEND
1 BACKGROUND - NO VESSEL 50-55 dBA
VESSEL ARRIVING AND MANUEVERING 68-72
VESSEL DEPARTING @ 50 Feet 70-73
@ 100 Feet 60-61
2 VESSEL IDLING 75
3 BELOW STACK VENT (Idling) 73
4 BELOW STACK VENT 76
5 ABOUT 100 FEET FROM STACK 60
RICHARDSON
BAY
BOAT STORAGE
1
2
3
4
5
50 0 200
SCALE IN FEET

NORTH

sausalito ferry terminal E I R

PREPARED BY:

Wilsey & Ham

SOURCE: Golden Gate Bridge, Highway & Transportation District

M.V. GOLDEN GATE NOISE OUTPUT

FIGURE 5

Land Use Category	Design Noise Level - L_{10}	Description of Land Use Category
A	60 dBA (Exterior)	Tracts of lands in which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	70 dBA (Exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks.
C	75 dBA (Exterior)	Developed lands, properties or activities not included in categories A and B above.
D		For requirements on undeveloped lands see paragraphs 5.a(5) and (6) of PPM 90-2.
E[1]	55 dBA (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: United States Department of Transportation, "Noise Standards," Federal Register, Vol. 37, No. 117 - June 13, 1972.

2.6.0 VISUAL CONDITIONS

The present visual setting of the ferry terminal site is made up of diverse elements whose character is mainly open views to the south and east and more enclosed views to the west and north. The principal visual element for all of Sausalito is the waterfront on Richardson Bay. It is open to views of Tiburon and Belvedere to the east, and central San Francisco Bay, the Bay Bridge, and San Francisco to the south. These are distant views, but to the north and west are closer-related elements of Sausalito itself, with two-and-three story commercial structures along El Portal and Bridgeway and the varying open spaces of Vina Del Mar Park and the City's parking lot to the west.

Looking north, the main close-in element is the Sand Spit, with boat storage area, yacht harbor, and restaurant at the tip. Encompassing these immediate surroundings of the ferry terminal site are the hills of the Marin Peninsula, developed with many homes, but thickly wooded. A final element to the north is Mt. Tamalpais, a major Bay Area landmark.

3 SECTION 3.0.0
SOCIAL, ECONOMIC AND MAN-MADE ENVIRONMENT

3.0.0 SOCIAL, ECONOMIC, AND MAN-MADE ENVIRONMENT

3.1.0 GOVERNMENT POLICIES

3.1.1 Local Government Policies

a. Golden Gate Bridge, Highway and Transportation District (GGBHTD)

The Bridge District's 1974 Golden Gate Corridor Transportation Facilities Plan states:

> "In addition to providing commuter service, the District plans to operate the ferries during the mid-day and on weekends as well (p.18)... The Golden Gate Bus System will be integrated with the ferry system (on weekends) to provide access for ferry riders to points throughout Marin and to Sonoma County recreational areas (p.19)."
>
> "The ferries in mid-day and weekend service will also offer a "multiport" service from San Francisco stopping at Sausalito, Central Marin, and return, with stop-overs and transfer privileges to the succeeding ferryboats or to the Golden Gate Bus System (p.19)."
>
> "While developing its longer range solutions, the District should proceed with its interim systems of bus and ferry transit and its improvements of the Bridge and toll plaza (p.42)... at least 50% of daily commuter traffic should be carried across the Golden Gate Straight in public transit by the year 1980 (p.44)."

The District's policies and intents concerning the proposed temporary terminal appear in Appendix A as Exhibit 1, Initial Study: Environmental Aspects of Temporary Ferry Landing Facility in Sausalito (GGBHTD, 1974).

Other District policies regarding the proposed ferry terminal are found in Section 1.0.0, Project Summary.

b. City of Sausalito

The proposed terminal is located within the City of Sausalito and, therefore, relates to the policies of the General Plan for Sausalito (Sausalito, 1970). Within the City of Sausalito, the General Plan designates two smaller planning areas called Marinship and Central Waterfront (Sausalito, 1970). The City of Sausalito has prepared and adopted General Development Plans for both planning areas and incorporated them into the City's General Plan. The Central Waterfront Plan was amended by the Park Plaza Plan, discussed below.

General Development Plan, Central Waterfront Area

Since the ferry terminal site is included within the Central Waterfront Area, it relates to the policies of the General Development Plan, Central Waterfront Area. The Plan designates the landside area of the terminal as "Public Park". This is the proposed Park Plaza. A pedestrian walk is planned along all of the shoreline of Point Sausalito, except through the Spinnaker Restaurant property. Adjacent to the proposed ferry terminal, ferry pilings enclose a ferryboat that is designated "Waterfront Commercial Over Water." (However, this use concerned the old ferryboat "Berkeley", which has since been removed from the Sausalito waterfront.) The following quotations from the Plan relate to the project vicinity:

> "Goals
>
> 8. Foster major waterfront recreation facilities, including such uses as small boating facilities, a basin for sailing boats, places to sit and enjoy the waterfront, walks and other related features outboard of Bridgeway (V.8).
>
> 9. Develop the Park Plaza as a focal point of the central area (V.8)."
>
> "Major Concepts for Development
>
> Outboard of Bridgeway areas are proposed to be used primarily for boat harbor, waterfront commercial, and public park purposes-or to remain as open water. Public park and limited commercial uses would occupy the Sandspit (V.9)."
>
> "Implementing Objectives
>
> 6. Provide limited off-street parking strategically located and restricted in amount only to serve those permitted uses for which parking in close proximity is essential.
>
>   a. To serve the demands of tourists, provide additional parking in the Marinship area with frequent shuttle service connecting to the central waterfront area (V. 12, 13).

9. Develop the Park-Plaza as a focal point in the central area.

   a. The potential enjoyment of an uncluttered Park-Plaza area designed as a pedestrian plaza is so great that a long-range program should be developed for eventually relocating auto areas near to, but outside of, the central plaza area (V. 10).

   b. Because the Yacht Club needs berthing space, dry boat storage, launching space, and parking space that cannot be reasonably supplied in its present location, a more suitable site should be found (V. 10).

   c. The existing elements of Vina del Mar Park which are arranged in an enclosing design should be redesigned to increase freedom of pedestrian circulation through the area. Until such time as Parking Lot No. 1 located to the east of the park is removed, or substantially modified to create a more pleasant visual experience, the park should remain in its present form. Regarding the landscaping of Parking Lot No. 1 and its ultimate conversion to an extension to Vina del Mar park should be the subject of a Park Plaza Plan (V. 10)."

The Park Plaza is further defined by the Park Plaza Plan (Sausalito, 1970).

Park Plaza Area Plan

Adopted by the City Council on May 18, 1971, the Park Plaza Area Plan encompasses most of the southern half of Sausalito Point. The Plan is divided into three stages: each stage is a different area and all three areas are adjacent to the project site. A summary of this plan appeared in the City of Sausalito Planning Commission's Official Report of April 14, 1971:

"Stage 1 Recommended the conversion of El Portal to a quasi-pedestrian street. The closure of Park Street between El Portal and Bridgeway and the expansion of Vina del Mar Park into the area occupied by Park Street and projecting into Parking Lot #1 to the extent of 28 spaces.

Stage II Related principally to the enhancement of the shoreline extending from the present location of the ferryboat Berkeley, northeasterly around the Sandspit toward the Spinnaker Restaurant.

Stage III Related principally to the conversion of the balance of existing Parking Lot #1 to a public Plaza area..."

Both Stage II and the General Plan for Sausalito (1970) advocate the relocation of the Sausalito Yacht Club now being expanded in its present location to allow for better pedestrian views of the Bay. The three stages as they appear in the plan are found in Appendix A as Exhibit 2. The dates of implementation of the stages have been delayed because of City Council studies and City Ordinance 794 A, an initiative measure requiring electorate approval of any implementation of the Park Plaza Plan.

Municipal Code

The City of Sausalito zones the project site "Open Area District," which allows primarily water areas, parks, and pleasure boat floats (Sausalito, 1964). The landside adjacent to the site is zoned "Public District." All of Sausalito's zoning districts permit transportation terminals and facilities upon issuance of a Conditional Use Permit. State law has exempted the Bridge District's Sausalito Ferry Terminal from this permit requirement.

Sausalito's building code is the Uniform Building Code with some revisions authored by the City.

Resolutions and Motions

On May 5, 1971 the City Council of Sausalito passed Resolution No. 2229 which fully supported the Bridge District's application for federal funding of additional ferryboats and buses (Exhibit 3, Appendix A). This Resolution refers to the new boats that would dock at the proposed ferry terminal.

Resolutions 2333 and 2373 contain policies relating to the planning of ferryboat terminals in Sausalito (Exhibits 4 and 5, Appendix A).

City Council adopted motions of April 9 and April 15, 1974 oppose any expansion of ferry services in Sausalito (Exhibits 6 and 7, Appendix A). Furthermore, the motion of April 15, 1974 declared that any enlargement or expansion of the existing terminal and the proposed Spaulding 165 to be incompatible with Sausalito's General Plan (Sausalito, 1970). See Exhibit 7.

c. Marin Municipal Water District (MMWD)

The proposed ferry terminal may require water service from the MMWD. On June 7, 1973 this water district adopted Ordinance No. 121 that prohibits with few exceptions any new water connections or expanded service to present customers unless a variance is granted by the MMWD Board of Directors.

On March 14, 1974 the Marin County Superior Court ruled the moratorium (Ordinance No. 121) illegal. However, until such time the Court of Appeals should uphold the lower court ruling, the moratorium will remain in effect.

3.1.2 County Government Policies

a. Marin County

On March 23, 1971, the Marin County Supervisors approved the Bridge District's Transportation Plan (GGBHTD, 1971), thus supporting the proposed ferry system. Also supporting the proposed ferry system is an element of the Marin Countywide Plan:

> "Transportation Policies
>
> Ferries
>
> Locate ferry terminals at sites that will serve recreational as well as commuting needs and that will cause a minimum of environmental damage and maximum patronage...
>
> Recreational Travel
>
> Use transit for recreational travel in a system producing minimum environmental damage. Automobiles must not be further emphasized as the primary means of access to coastal recreation areas (Marin County, 1973).
>
> Recommendations for Transit
>
> Trans-Bay Ferry System
>
> Existing service to Sausalito and Tiburon will be supplemented in stages with new service-initially to Larkspur and possibly in the future to Las Gallinas Creek and Novato. The potential of ferries for recreational travel will be analyzed in Phase III of the Balanced Transportation Program" (Marin County, 1973, Part 4, p.5).

The Countywide Plan designates the project site for ferry terminal use.

b. City and County of San Francisco

On April 9, 1971, the Board of Supervisors of the City and County of San Francisco endorsed plans of the Bridge District to improve their system of buses and ferries.

3.1.3 Regional Government Policies

a. San Francisco Bay Conservation and Development Commission (BCDC)

Any new development within 100 feet of the Bay shoreline requires a permit from BCDC. Permit approval is based upon conformance with the Commission's San Francisco Bay Plan (BCDC, 1969). The Plan mentions that a commuter ferry terminal is a possibility in the Sausalito Point area:

> "Sausalito - Possible Commuter Ferry Terminal. To minimize traffic and parking problems should be served by mass transit or else designed to serve Sausalito and Mill Valley only with other terminals serving the rest of Marin (BCDC, 1969, Plan Map 11)."

Plan Map 11 also depicts a proposed recreational ferry terminal on the shoreline of the Sausalito east of Olive Street. This facility would be located about one mile north of the downtown ferry terminal.

A transportation policy of the Bay Plan is the following:

> "The Bay represents a great but little-used resource within the region...a system of modern ferries (capable of high speeds with minimum noise and waves) may be able to provide service between major traffic generators (e.g., between downtowns, or between airports) and eventually to provide scheduled service from one end of the Bay to the other for both commuting and pleasure use...(BCDC, 1970, p.28)."

Other policies in the plan stress BCDC's support of public access to the Bay as well as public parks on the Bay shoreline.

b. Association of Bay Area Governments (ABAG)

ABAG's Regional Plan 1970:1990 recommends that the Bay Area develop a more varied transportation system including water transport systems (ABAG, 1970, p.17-18). The Plan's policy guidelines for growth and development include the following:

> "Public transit service should be improved to the degree that it offers the public a more attractive means of urban-oriented travel than the automobile. Especially in areas of severe traffic congestion, where additional highway facilities would not provide adequate improvement or would have adverse community effects, all efforts should be made to encourage a shift from private automobile to public transportation."

The ABAG Land Use Plan designates all of Sausalito's land area as "Predominantly Residential."

c. Metropolitan Transportation Commission (MTC)

The Metropolitan Transportation Commission's Regional Transportation Plan map shows the existing Sausalito/San Francisco ferry routes as well as the Tiburon/San Francisco ferry route (MTC, 1973). The Larkspur/San Francisco ferry route is shown on the Plan as a "Committed Transportation System". The Plan states that the present plans for ferries and terminals are a high priority item and should be implemented in 1974. Expansion of the ferry system beyond present plans is recognized as a need that may exist.

d. Bay Area Air Pollution Control District (BAAPCD)

The BAAPCD has jurisdiction over all the nine Bay Area Counties: Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, Napa, Solano, and Sonoma.

The District has enacted four regulations designed to reduce air contaminants from various sources. Two of these regulations are applicable to the ferry terminal.

1. Institutes direct controls on particulate matter, lead, nitrogen oxides, sulfur dioxide, sulfuric acid, and odorous substances from industrial and commercial sources and organic gases from incinerators.

2. Affects the formulation, storage, shipment, and use of such materials as solvents, paint, and gasoline (BAAPCD, 1972, p. 20-25).

In order to build or operate facilities with air pollution potential, a BAAPCD permit is required. Such a permit will not begranted if BAAPCD air quality standards are not met within a one-mile radius of the project site.

3.1.4 State Policies

a. State Legislature

In 1969, the State Legislature empowered the then Golden Gate Bridge and Highway District to operate ferry service as well as any other mode of transportation (AB 584). State law exempts the District from local government regulations.

3.1.5 Federal Policies

a. U.S. Department of Transportation, Urban Mass Transportation Administration

The U.S. Urban Mass Transportation Administration is financing 66-2/3 to 80 percent of the cost of three new Spaulding vessels and will also finance 66-2/3 to 80 percent of the proposed terminal if the terminal meets their approval.

b. U.S. Army Corps of Engineers

Any projects that affect navigable waters (such as Richardson and San Francisco Bays) must be approved by the Army Corps of Engineers (U.S. River and Harbor Act of 1899, as amended). Approval is given in the form of regulatory permits. Such permits are required for Bay projects such as dredging, filling, breakwater, piers, and docks.

c. U.S. Coast Guard

Headquartered in San Francisco, the 12th Coast Guard District has jurisdiction for policing boating and docking facilities on San Francisco Bay. The Coast Guard enforces the portions of the Code of Federal Regulations relating to boating. The Code contains numerous specifications pertaining to ferryboats, their safety equipment, and terminals and permitted carrying capacities. These specifications are enforced by regular Coast Guard inspections. The Coast Guard also polices boating operations and any water pollution that may result from boats. The M.V. Golden Gate currently operates under full certification.

3.2.0 IMPROVEMENTS

The project site is owned in fee by the City of Sausalito. The City has leased all of the site to the firm of Madden and Lewis, which has subleased portions of the site to the Sausalito Yacht Club and the Bridge District.

North of the project site, the Sausalito Yacht Club has constructed a club house building on pilings and a small pier. On the land next to the club is a small paved parking lot for automobiles.

South of the Yacht Club are the Southern Pacific piers and obsolete pilings that were formerly part of the ferryboat docks. Portions of the piers are now utilized by the Bridge District to load and unload the M.V. Golden Gate passengers. Attached to the south side of these piers, the Bridge District has constructed a temporary passenger loading float.

The southern extent of the piers is no longer used. The paved land area next to piers is used partially as a walkway and as a street within City Parking Lot 1. This street is within both the project site and the Madden and Lewis lease area.

Along the entire shoreline of the project site, loose rock and concrete rubble has been dumped as a protection against erosion.

3.3.0 PUBLIC UTILITIES

3.3.1 Water

The existing ferry terminal site, located in the downtown waterfront area of Sausalito, is presently being served by Marin Municipal Water District headquartered in the nearby City of Corte Madera. Water use at the terminal is from a shoreside hose used to wash down the float. From December 3, 1973 through June 1974, this resulted in the consumption of 3,100 cubic feet, or approximately 23,200 gallons, of water (Marin Municipal Water District). Pro-rated over a 12 month period, this would amount to approximately 39,600 gallons of water annually. In addition to this, the M.V. Golden Gate takes on water at the U.S. Army Corps of Engineers facility located in North Sausalito. Approximately 4,200 gallons of water per week is used for the vessel's potable water needs. In addition, an estimated 2,800 gallons per week (also consumed at the U.S. Army Corps of Engineers Facility) is used to wash down the vessel for a weekly water demand totaling approximately 7,000 gallons (Golden Gate Bridge, Highway and Transportation District, 1974).

Currently the water district's total yield for planning purposes is estimated at between 31-33,000 acre-feet annually. In 1973, a water resources study conducted for the districted suggested that the water yield be lowered to a safe 26,000 acre-feet annually(CH_2M Hill, 1973).

The district has concluded that reserves are dangerously low and new sources are needed to adequately accommodate new water demands without increased depletion of existing reserves. On June 7, 1973 the district adopted Ordinance No. 121, "prohibitions and restrictions on new water service connections." The ordinance became effective as of April 30, 1973. The provisions of the ordinance include:

> "A. A water shortage emergency condition prevails within the area served by this district due to a threatened water shortage;
>
> "B. The ordinary demands and requirements of water consumers of this District cannot be satisfied without depleting the water supply of this District to the extent that there would be insufficient water for human consumption, sanitation and fire protection;

> "C. It is necessary to prohibit new water service connections and other additions to the distribution system of the District in order to conserve the water supply for the greatest public benefit with particular regard to domestic use, sanitation and and fire protection, and the prohibitions and restrictions contained herein will fulfill that purpose;
>
> "D. The water uses prohibited and restricted by this ordinance are hereby determined to be nonessential."

Approximately 5 months later, in November, 1973, a bond issue to provide for additional facilities was defeated.

In response to the MMWD moratorium (District Ordinance No. 121) civil suit was filed by the McCarthy Company of San Rafael (a member of the Associated Building Industry). On March 14, 1974 Marin County's Superior Court Judge E. Warren McGuire ruled that the moratorium is illegal since MMWD's mandate granted by State Legislature does not include any jurisdictional power in the field of zoning, land use and population control. Subsequently, MMWD responded by motioning for a new trial based upon new evidence. On June 25, 1974 Judge McGuire ruled against reopening the case.

Although the moratorium has been ruled illegal, it should be noted that until the Court of Appeals rules on the validity of the lower court decision the moratorium will remain in effect (personal communication with MMWD Attorney Tom Thorner).

3.3.2 Natural Gas and Electricity

The M.V. Golden Gate uses no appreciable amount of energy while in port. However, during dark hours, an outside floodlight is used while the vessel is docking (Golden Gate Bridge, Highway and Transportation District).

The ferry terminal does not consume any natural gas.

3.3.3 Fuel

The M.V. Golden Gate consumes approximately 200,000 gallons of diesel fuel Number 2, annually (Golden Gate Bridge, Highway and Transportation District).

3.3.4 Sewage

Presently, the only sewage generated from the existing ferry service is from the M.V. Golden Gate (the terminal generates no sewage). An average rate of 700-800 gallons of effluent per day is held in a holding tank aboard the ferry and pumped ashore into a connection with the Sausalito-Marin City Sanitary District's treatment plant at Fort Baker, located southwest of Sausalito. There are plans to install a low water use toilet system in the vessel. This would reduce the discharge to about 100 gallons of effluent per day (Golden Gate Bridge, Highway and Transportation District).

The District's plant provides treatment of a primary level and consists of a clarifier and an anaerobic sludge digester with chlorination. The design capacity of the plant is two million gallons per day with the present dry weather load at approximately 1.8 MGD. During the wet season, the load has gone as high as 8 MGD (Sausalito-Marin City Sanitary District).

3.3.5 Solid Waste

The M.V. Golden Gate and the Sausalito ferry terminal generate approximately 104 cubic feet of waste per day (Larkspur Ferry Terminal Environmental Impact Report). Of the total generated, approximately 23 cubic feet per day is collected at North Sausalito and hauled away by Bay Cities Refuse Service, Inc., which is located in the City of Richmond. The remaining 81 cubic feet of solid waste is generated on board the vessel and is collected at the San Francisco terminal.

3.4.0 EXISTING TRANSPORTATION ENVIRONMENT

The location of the proposed ferry terminal in downtown Sausalito requires a discussion of existing transportation conditions in terms of both weekday and weekend peak hours. Local traffic is heavy on weekends because of many visitor activities in Sausalito. This section is a summary of a transportation report by Wilsey & Ham in Appendix E. The data and conclusions of this section are based on detailed assumptions and data documented in this Appendix. Thus, this Appendix should be referred to for further clarification of Section 3.4.0.

3.4.1 Weekday Transportation Conditions (Monday through Friday)

Generally, the local transportation facilities relating to the ferry terminal access are most heavily utilized between the hours of 4:00 and 6:00 p.m.

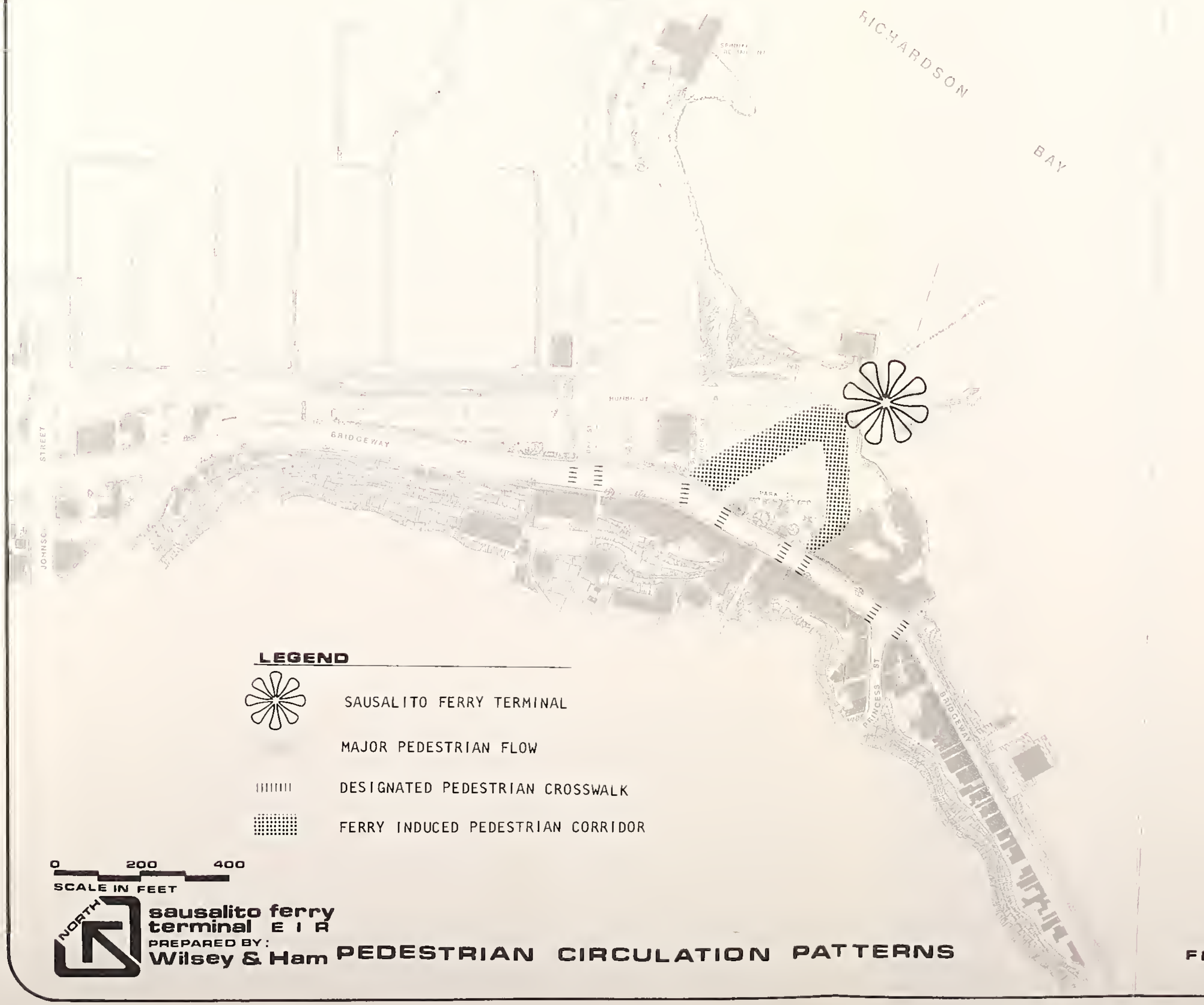
Bridgeway is the major arterial providing a direct traffic connection between north and south Sausalito. In the downtown area where the ferry terminal is located, Bridgeway is a two-way street regulated by traffic signals at Princess, Bay, and Johnson Streets. A speed and travel time survey conducted on Bridgeway in June, 1973 indicated that the Friday peak-hour vehicular traffic speed between Princess and Bay was less than 10 miles per hour. All indications are that this arterial is operating near capacity during the summer p.m. peak hours. See Figure 6.

At present, the ferry system makes 11 weekday round trips between San Francisco and Sausalito with two arrivals at Sausalito between 4:00 and 6:00 p.m. Ferry patronage in the summer months is generally higher because of increased visitor travel at that time of the year.

There are three major types of terminal access modes for ferry users: bus transit, walking, and others.

1. Bus Transit

   Bus services are provided by the Golden Gate Bridge, High-Way and Transportation District. Both the feeder and line-haul systems serve the downtown terminal area. The feeder system provides a direct connection between the ferry terminal, the District parking lot in North Sausalito, and southern Marin communities (Mill Valley, Tamalpais Valley, and Marin City). These buses stop at Anchor and Humboldt for loading and unloading passengers. Normally, about half of all ferry patrons use the feeder system for terminal access during commuter hours. The line-haul system connects San Francisco with cities in Marin and Sonoma Counties, but many of these runs serve downtown Sausalito near the ferry terminal.



sausalito ferry terminal E I R
PREPARED BY:
Wilsey & Ham

PEDESTRIAN CIRCULATION PATTERNS

FIGURE 6

2. Walking

   Walking as access to the ferry is used by about one-third of peak-hour passengers whose residences are within a reasonable walking distance from the ferry terminal. A ferry passenger survey has shown that more than half of all ferry patrons living in Sausalito use this mode. The median walking distance of 0.40 miles is greater than the 0.25 mile distance normally expected for walking to transit service.

3. Other Modes

   Other types of access are automobile, bicycle, and taxicab. Used by about 15 percent of all peak-hour passengers, traffic generated by these modes affects other vehicular operations in the downtown area. Auto access can be park-and-ride or "kiss-and-ride" (ferry users dropped off at the terminal).

3.4.2 Weekend Transport Operations (Saturdays, Sundays, and Holidays)

Because of the visitor amenities of Sausalito, heavy weekend peak-hour vehicular and pedestrian traffic generally occurs from noon to 7:00 p.m. Stop-and-go movement often extends north to Napa Street and south to Richardson Street, and beyond. A 1973 traffic survey indicates vehicular speeds on Bridgeway north of Napa Street range between 24 to 30 miles per hour, whereas southbound traffic speed goes as low as 3 miles per hour between Bay and Johnson Streets.

The present ferry service is 8 round trips per day on Saturday, Sunday, and holidays. Maintaining a 90-minute headway, the system generally has a higher daily patronage than weekdays and there is a smaller seasonal variation in patronage compared with weekday operation. While delivering a large number of persons to Sausalito on each run, the ferry also carries a similar number back to San Francisco.

1. Bus Transit

   During weekends and holidays, fewer transit vehicles are operated to serve the downtown area in general and the terminal in particular. Line-haul services are available, but only one feeder bus is scheduled with each ferry operation.

2. Walking

The proximity between downtown activities and the ferry terminal makes walking the most significant access mode. Pedestrians normally compete with vehicular traffic for circulation spaces in downtown intersections. The pedestrian visitors' routes originate from off-street parking lots and the ferry terminal, and destinations encompass all facilities within walking distance. Pedestrian facilities are primarily sidewalks on downtown streets, but facilities not designed for but used by pedestrians include off-street parking lots and vehicular rights-of-way. Pedestrian linkages are provided by crosswalks located and marked at certain intersections, but most pedestrian flow is linear along downtown Bridgeway.

3. Other Modes

Since most ferry patrons are visitors making a trip to downtown Sausalito, there is a minimal usage of auto, taxi, or bicycle. Traffic on downtown streets is less affected by vehicles than by pedestrians associated with the terminal access.

3.5.0 ECONOMIC ACTIVITY AND EMPLOYMENT

Portions of this section were prepared by LeBlanc & Company, planning economists. See Appendix F.

3.5.1 Regional Economy

The Bay Area regional economy, typical of major metropolitan areas, is well diversified. Table 2 of Appendix A shows the number of workers and percentage of total employment by industry for the nine-county San Francisco Bay Area for the years 1960, 1966, 1970, and 1971. The proportion of the Marin County employment within the region is tabulated in Table 3 of Appendix A.

3.5.2 Marin County Economy

The economy of Marin County is profiled by the number of jobs by industry or the type of economic activity. Table 4 of Appendix A is a tabulation of the number of workers by industry for the years 1960 and 1970. In 1970 the three leading industries in terms of total employment were government, services, and trade (California Employment Development Department, 1973, p. 74). In 1960 the leading industries were government, trade, and services. On a percentage basis, the fastest growing industries between 1960 and 1970 were: (1) services; (2) trade; and (3) government.

3.5.3 Local Economy

Economic activity in Sausalito is concentrated into four major groupings: (1) boat construction, repair, and services, including marina services and chandlery; (2) limited, specialized manufacturing and distribution; (3) local and visitor-oriented retailing and services; and (4) professional and technical services, including real estate, architecture and engineering, finance, and law.

Of these major categories, the most visible are the boating and manufacturing activities on the waterfront north of Central Sausalito, the business and commercial activities making up Central Sausalito, and the activities in the Caledonia-Bridgeway zone. Slowly emerging into more prominence, however, are actual or planned concentrations of professional office space and other commercial centers throughout the waterfront zone north of Central Sausalito. Already within the entire north waterfront zone are located a number of regional-serving employers that provide a significant number of jobs to Sausalito residents and others commuting into Sausalito to work (see Table 7). Important members of the group are Heath

TABLE 7

MAJOR EMPLOYERS LOCATED IN SAUSALITO, 1974
(Establishments/Agencies Employing 50 or More Persons)

Name	General Location
Alta Mira Hotel	Central Sausalito
E.D. Bullard Company	North Waterfront
Geo. T. Gerhardt Company	North Waterfront
Heath Ceramics, Inc.	North Waterfront
Sausalito Public Schools	North Waterfront and School Sites
U.S. Army Corps of Engineers	North Waterfront
City of Sausalito	Central Sausalito and Fire Stations
Various restaurants, gas stations and supermarkets	City-wide

Source: Marin County Chamber of Commerce and Visitors Bureau, 1974

Ceramics (pottery), the U.S. Army Corps of Engineers, the E.D. Bullard Company (industrial safety equipment), a number of commercial fishermen, sailmakers and rigging specialists, yacht brokers, boat haulout and storage yards (Jerry's, Keeler, Sausalito Marine, Sea Ventures, Anderson's, Alex and Bob's, Channel Marine, and others). Design, graphics, and printing firms can also be found here (Sasaki-Walker-Roberts; Desmond Muirhead; Marin Graphics; The Wedell Group and other firms), along with realtors, attorneys, and other services.

Central Sausalito, in the general area of the ferry terminal, of course, contains the bulk of the city's retail and commercial services inventory, as well as numerous restaurants. The Sausalito city offices are located on Bridgeway, as are two banks (Wells Fargo and Bank of America). Retail stores are small, and oriented to higher-priced, impulse purchasing of apparel, jewelry, and speciality items. The only major concentration of shops in one structure is the well-known Village Fair complex on Bridgeway. Restaurants and bars dot the area.

The Caledonia-Bridgeway zone further north is a mixture of stores, offices and more locally oriented than the Central Sausalito zone. Sausalito's cinema (The Marin) is here, and a few notable retail stores are nearby. At least three food markets are also located in this vicinity serving the uphill residential areas.

Visibly absent from Sausalito's mix of commercial activities is any major new hotel/motel facility. The city does contain three older facilities (The Sausalito Hotel on Bridgeway in the Central Zone, the Alta Mira and Casa Madrona above Central Sausalito). No new facilities have been constructed in the last forty years, but a Howard Johnson's Motel is located in Tamalpias Valley just north of Sausalito, and a number of north Sausalito waterfront development proposals contain such facilities.

Outside direct payrolls from employers and the earnings of self-employed professional people, Sausalito's major area of employment is connected to retail sales and services. An examination of the importance of these categories to Sausalito indicates that:

> Sausalito contains some three percent of Marin County's residents, but generates seven percent of taxable retail sales countywide.
>
> Sausalito retail sales per capita (1973 levels) is roughly $3,000; for Marin County as a whole, the figure is $1,400.

Within the actual reporting categories of retail sales and services (as recorded by the California State Board of Equalization), Sausalito shows a distinct shift towards volume oriented to visitors; for instance, in 1973 Sausalito recorded eating and drinking sales totaling 36 percent, but a high volume of apparel sales (10 percent). See Table 8 for community comparisons discussed here.

Growth in the population of Sausalito over time may also be reflected in the 1963-1973 retail sales pattern. For instance, Table 9 shows that retail sales outlets in Sausalito in 1972-73 are at an all-time high, and double that of 1968. General merchandise outlets have stabilized, and eating and drinking outlets leveled off after increasing by one-third since 1963.

Sales have increased significantly. Volume in apparel shops, for instance, is up to $2.7 million (from $.6 million in 1963). Eating and drinking volume has more than doubled ($9.9 million against $4.8 million). Even allowing for inflation, Sausalito apparel and restaurant sales have grown rapidly since the mid-sixties.

Total retail sales (all reporting outlets) also are up, significantly--even in real terms. Table 10 illustrates this growth pattern, and some of the erratic fluctuations in sales volume since 1968 which are not fully explainable.

Overall, the importance of retail sales and services to Sausalito is likely to grow, and the impact of levels of visitation to Sausalito will be considerable--since the city cannot by itself generate the volumes supported by outsiders.

In total, there are in Sausalito just under one hundred retail outlets of all types (stores, grocery/supermarkets, restaurants and bars, service stations and the like), which is a considerable concentration for a small city of some three thousand households. How much of this concentration survives entirely on visitor expenditures is difficult to tell.

Further, Sausalito's future may be tied heavily to its role as a visitor destination. Many of the current proposals for waterfront development include plans for new retail shops, restaurants, and even hotels. Whether or not long-term, market support exists for all of these proposals is questionable. If, in fact, development of this type occurs, Sausalito's provision of visitor services will be much reinforced. If these projects do not emerge, visitation will continue to be hosted by the relatively small, concentrated area of services in Central Sausalito.

TABLE 8

RETAIL SALES OF SELECTED TYPES OF BUSINESS OF VARIOUS MARIN COUNTY CITIES AS A PERCENT SHARE OF TOTAL COUNTY SALES 1973

	RETAIL SALES 1973				
	PERCENT OF TOTAL MARIN COUNTY				Percent of Total Marin County
	Sausalito	Mill Valley	San Rafael	Novato	
Apparel	10	4	7	1	6
Home Furnishings	2	3	6	4	5
Eating and Drinking	36	15	6	11	12

Source: California State Board of Equalization, Taxable Sales in California (Sacramento: State Board of Equalization, 1973).
LeBlanc and Company

TABLE 9

SELECTED RETAIL TRADE STATISTICS
CITY OF SAUSALITO
1963-1973

	Apparel			Eating/Drinking			General Merchandise	All Other
	Outlets	Sales[a/]	% Change	Outlets	Sales[a/]	% Change	Outlets[b/]	Outlets[c/]
1963	12	$ 636	-	28	4,867	-	1	31
1964	11	711	12	28	5,298	9	1	36
1965	13	861	21	26	4,960	(6)	2	39
1968	14	1,056	23 (3 years)	29	6,415	29 (3 years)	4	58
1969	17	1,402	33	28	6,678	4	4	72
1970	26	1,703	21	33	7,457	12	3	80
1971	21	2,143	26	38	7,896	6	3	76
1972	25	2,378	11	38	9,126	16	4	83
1973	24	2,725	15	37	9,938	9	3	82

---

a/ Sales in thousands of dollars (taxable only).
b/ No actual sales available.
c/ Excludes automotive repair, garages, etc.

Source: California State Board of Equalization, Taxable Sales In California (Sacramento: State Board of Equalization, 1973).

TABLE 10

RETAIL SALES AND PERCENT CHANGE
CITY OF SAUSALITO AND MARIN COUNTY
1963-1973

	Taxable Retail Sales[a] Sausalito	Change (%)	Taxable Retail Sales[a] Marin County	Change (%)
1963	$ 9,396	-	$166,485	-
1964	10,607	13.0	187,507	13.0
1965	11,627	10.0	203,546	9.0
1966	NA	-	212,880	5.0
1967	NA	-	222,518	5.0
1968	15,561	34.0 (3 yrs.)	253,964	14.0
1969	17,358	12.0	275,083	8.0
1970	18,863	9.0	282,021	3.0
1971	20,210	7.0	312,104	11.0
1972	24,062	19.0	366,278	17.0
1973	27,370	14.0	424,214	16.0

---

[a] Sales in thousands of dollars

Source: California State Board of Equalization, Taxable Sales in California (Sacramento: State Board of Equalization, 1963-1973).

3.5.4 Labor Force and Unemployment

The Marin County labor force was estimated to average 54,700 during 1970 (California Employment Development Department, 1973). Table 5 of Appendix A lists the estimated employment and unemployment for the San Francisco-Oakland Metropolitan Area during the last 10 years.

Unemployment has varied from a low of 56,400 in 1968 to a high of 86,600 in 1971. The traditional concept of unemployment and its measurements has recently been supplemented by a new concept of employment needs by the U.S. Department of Labor and the California Employment Development Department (EDD). This new concept, called the "universe of need", seeks to estimate the subemployment problems of certain segments of the society, particularly the disadvantaged. Table 6 of Appendix A defines this concept as well as a number of associated terms. These terms are used in Table 7, Appendix A which shows the number of persons with employment-related problems in the San Francisco-Oakland Standard Metropolitan Area (SMSA).

3.5.5 Basic and Nonbasic Employment

The economy is distinguished according to two fundamental qualities--basic and nonbasic. These qualities denote the economic forces that affect employment.

The basic (or export) sector of the economy is generated by forces outside the local economic area. This sector is principally composed of activities, such as manufacturing, that stimulate the local economy by exporting products (or certain services) to bring outside money to the local area. The trend of the basic economy of Marin County is reflected in the employment figures on Table 8 of Appendix A.

The nonbasic economy is noted by the employment levels of its principal component industries in Table 8 of Appendix A.

The relationship between county basic and nonbasic employment is presented in Table 8 of Appendix A. In 1970 there were 4.1 nonbasic jobs for each basic job. This high nonbasic to basic ratio confirms Marin County's residential and service-oriented economy compared to other Bay Area counties.

3.5.6 Distribution of Income

During 1969, the earnings of 2,359 Marin County families were less than the poverty level as determined by the U.S. Bureau of Census. thus, 4.5 percent of Marin County's families were below the poverty level. The poverty level ranges according to several factors, including number of family members. The average poverty level of a nonfarm family of four was $3,745 for 1969 (U.S. Census, 1970). Table 9 of Appendix A shows the distribution of families at various income levels in Marin County for the year 1969.

In the City of Sausalito the earnings in 7 percent of the households in 1969 were below the poverty level (U.S. Census, 1970). Table 10 of Appendix A shows the distribution of families at various income levels in the City of Sausalito for the year 1969.

3.5.7 Socioeconomic Data Comparison--Sausalito and Marin County

Table 11 is a comparison of selected Sausalito socioeconomic data to that of Marin County. The data supports the premise that most of Sausalito's job holders are employed in institutional, service and professional occupations, and that their incomes are well above the County average. A glance at Sausalito's census-reported median family income ($15,336 in 1969) illustrates this; the Marin County figure for 1969 is $13,935. Sausalito housing prices are also well above the Marin County average, particularly for single-family homes in the hills.

TABLE 11

SELECTED SOCIOECONOMIC DATA
SAUSALITO AND MARIN COUNTY
1970

Item	City of Sausalito	Marin County	Sausalito Percentage of Marin County
Resident Population	6,158	206,758	3
Households	3,094	67,606	5
Average Household Size	1.98	2.94	-
Median Age (Years)	29.5	33.3	-
Civilian Labor Force	4,189	84,557	5
Employed	3,971	80,620	5
Unemployed (%)	5.2	4.7	-
Personal Income			
Median Household	$ 15,336	$ 13,935	110
Mean Household	$ 18,866	$ 16,136	117
Taxable Retail Sales	$18,863,000	$282,021,000	7
Retail Sales Per Capita	$ 3,063	$ 1,440	213
Number of Retail Outlets	83	1,684	5

Sources: U.S. Bureau of the Census, 1970 Census of Population (Washington, D. C. : Bureau of the Census, 1971).
California State Board of Equalization, Taxable Sales in California, (Sacramento: State Board of Equalization, 9163-1973).

3.6.0 POPULATION

3.6.1 Urban Pattern

Most of the region's urbanized area is located along the plain bordering San Francisco Bay. The proposed ferry terminal is located in the City of Sausalito's downtown waterfront area. The region's urbanized areas are shown in Section 1.2.0, Figure 1, Regional Setting.

3.6.2 Regional Distribution

The distribution of regional population in the nine San Francisco Bay Area counties is shown in Table 11 of Appendix A. At the time of the 1970 U.S. Census, 85.8 percent of the regional population total of 4,620,199 was concentrated in Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara Counties. With 206,038 people, or 4.5 percent of the regional population, Marin County ranked sixth in population of the Bay Area Counties in 1970.

3.6.3 County Distribution

The distribution of Marin County's population is largely located in the eastern urban corridor. The population for the City of Sausalito in 1960 totaled 5,331. By 1970 the population had risen to 6,158 (U.S. Census). Over the ten-year period the percentage change was 15.5, amounting to approximately a one-and-a-half percent yearly increase. Table 12 of Appendix A shows the distribution of county population by cities.

The age and sex distribution of Marin County's 206,038 residents in 1970 are shown in Table 13 of Appendix A.

3.6.4 Local Distribution

Sausalito's population (including the population within the city's "sphere of influence") reflect the following characteristics:

> The population covers the entire spectrum of household types, economic and social status, and interests or beliefs.
>
> The wealthy segment of this population is concentrated in the hills of southern Sausalito; those of modest means and those of very limited income are in the northern area--particularly Marin City.
>
> Sausalito's family profile is changing from moderately sized households to smaller households (more childless families and singles).

The diversity of the resident population is also reflected in the occupations of labor force members. By far, the largest of concentrated labor force is within the professional, government, and institutional areas. A substantial number of Sausalito's residents are self-employed. Much of the labor force works for federal-state-county-city agencies, in Marin and San Francisco locations. Some work in local manufacturing, boating, and commercial enterprises.

Without question, however, the bulk of Sausalito's resident labor force works elsewhere, primarily in San Francisco, some elsewhere in Marin County. The 1970 U.S. Census compiled statistics on Sausalito residents commuting daily to other locations for employment; other agencies have subsequently developed similar information (County of Marin, Association of Bay Area Governments, Metropolitan Transportation Commission, GGBHTD). It is estimated that at the present time, some 70 percent of Sausalito's 4,500 person labor force live in Sausalito, but work in other locations, primarily San Francisco.

3.6.5 Population Increase

During the ten-year period between 1963 and 1972, the annual increase in population of Marin County has varied between a high of 8,000 during the 1964-1965 period, to a low of 100 between 1971-1972 period (California State Department of Finance). Table 14 of Appendix A shows the 1963-1972 estimated population in terms of yearly and percentage increases.

3.6.6 Population Projections

According to the Marin County Planning Department, the county's population is expected to increase to a total ranging from 300,000 to 365,300 by 1990. The State Department of Finance's population projection for Marin County in 1990 varies between 285,000 and 365,200 on the basis of certain growth rate assumptions (California State Department of Finance, 1972). The Association of Bay Area Governments' population projection for Marin County in 1990 varies between 246,556 and 310,798 (Association of Bay Area Governments, 1973).

3.7.0 HOUSING

3.7.1 Characteristics

As of April 1, 1970 (U.S. Census), there were a total of 71,241 housing units in Marin County. Table 15 of Appendix A summarizes some of the general characteristics of the county's housing supply.

A majority (72.7 percent) of the total housing units were single-family units (U.S. Census, 1972). Of the total 67,606 occupied units counted at the time of the census, 41,154 or 60.9 percent were owner-occupied. Median value of owner-occupied units was in the \$25,000-\$34,999 range, which represented 12,667 units or 32.9 percent of the total stock. The \$150-\$199 per month rental units accounted for 7,291 units or 28 percent of all renter-occupied units. The median contract rent was \$161 per month (U.S. Census, 1972).

3.7.2 County Development Trends

Table 16 of Appendix A profiles the number of new dwelling units in Marin County authorized for construction by type of structure for the years 1962 through 1973. the total number of units per year ranged from a high of 4,603 in 1963 to a low of 1,102 in 1967 (Security Pacific National Bank, 1971, 1972, 1973).

The type of units constructed has varied through the last decade. Generally, about one-half of all units built during the 1962-1973 period have been single-family units. The percentage of single-family units of the total housing stock has ranged from a high of 75.8 percent in 1965 to a low of 35.6 percent in 1973.

3.7.3 Local Development Trends

Table 17 of Appendix A profiles the number of new dwelling units and permit valuation in the City of Sausalito by type of structure for the years 1971, 1972, 1973. Of the years surveyed, 1973 recorded the largest number of units constructed, 15 single-family units, and 75 multifamily units, for a total of 90 units. For the same year, total new residential valuation amounted to \$2,279,000. Of the three years, 1973 recorded the largest amount of nonresidential valuation totaling \$3,129,000 (Security Pacific National Bank, 1971, 1973, 1973).

3.7.4 Local Housing Market

A cursory study of the Sausalito housing market indicates that residential opportunities in Sausalito are expensive, in short supply, and likely to remain so. This condition is prevalent throughout Southern Marin, where a combination of mortgage rates, construction costs, public resistance to development and water/sewer system problems have reduced housing construction and subsequently inflated the selling prices of existing stock.

Potential expansion of Sausalito's housing market is further restricted by a distinct lack of available, readily developable land. Limited sites (only a handful) exist in the older hillside neighborhoods. The land west of U.S. 101 (primarily the Wolfback Ridge area) will either be purchased for public use as part of the Golden Gate National Recreation Area or limited to development of expensive residences.

Marina Vista at Nevada Street above Bridgeway is Sausalito's only "project" of any size. This attached (townhouse) condominium project has weathered a number of financial and other problems, and is now in the final stages. Units have been reduced in size (3 to 2BR) and raised in price (level is now $58,000-up). Absorption has been supported, by a current lack of similar development in Mill Valley or Tiburon.

Additional housing in Sausalito may come, if at all, on the waterfront north of Central Sausalito to Waldo Point. Numerous proposals for water-oriented residential development are before Sausalito's City Council and Planning Commission. At this time, none of the proposals have received all required approvals by the City.

Brokers active in Sausalito report less than one percent vacancy in the available inventory, with quality single-family dwellings now priced above $70,000, and average monthly apartment rentals in excess of $250. Even older bungalows and cottages are selling in the $40,000-$50,000 range, or renting for high returns. The future for Sausalito, due to its location, amenities and topography, indicates a continuation of this present trend.

3.8.0 HISTORICAL AND ARCHAEOLOGICAL FEATURES

3.8.1 Historical Features

Rancho Sausalito was granted to William A. Richardson in 1838, although the final patent on the 19,572-acre rancho was not issued until 1872, after Richardson's death in 1858 (Hoover, Rensch, and Rensch, 1966). Richardson Bay, the waterfront of Sausalito, is named for this first settler of the area, and he commenced Sausalito's water-oriented economy with fresh water and produce distribution by boat around San Francisco Bay. Whalers and fishing fleets have been based in Sausalito, and the first reliable boat service to San Francisco came after 1855, provided by the Sausalito Land and Ferry Company, near the present ferry terminal site. This area on the Central Sausalito waterfront, has been the location of successive ferry service provided by the railroads and the Golden Gate Bridge, Highway & Transportation District.

This area is also the main business district of the City,

3.8.2 Archaeological Features

The terminal site is on past artificial fill (see Section 2.3.5) and no archaeological resources are likely to have existed in the immediate area, since the site was originally under water.

4 SECTION 4.0.0
IMPACTS ON THE NATURAL ENVIRONMENT

4.0.0 IMPACTS ON THE NATURAL ENVIRONMENT

4.1.0 ATMOSPHERIC AND CLIMATIC IMPACT

This section is based on a report included in Appendix B, by Albert Miller, Ph.D., consulting meteorologist.

4.1.1 General Conditions

The ferry terminal development has the following characteristics that are pertinent to this report:

a. Surface changes

There will be no changes in the current land use or highway network.

b. Emissions into the atmosphere

Pollutants generated by automotive and ferry traffic are of primary concern in Sausalito, since there are no heavy industries.

Emissions by ferries, buses, and automobiles during peak traffic hours in Sausalito are presented in Table 12. Traffic estimates were provided by Wilsey & Ham (See Section 5.5.0).

4.1.2 Automotive and Bus Emissions

Automobile emission rates for all the types of pollutants generated vary greatly by model, year, condition, and speed of an individual vehicle, as well as the effectiveness of any controls that may be installed. At the present time, California and U.S. Environmental Protection Agency standards for the principal effluents from 1974 model automobiles are: 3.2 grams/mile for hydrocarbons (HC), 39 grams/mile for carbon monoxide (CO), and 2 grams/mile for oxides of nitrogen (NO_x). (For 1975 models, these will be 0.9, 9, and 2, respectively.) However, most studies of vehicle emissions indicate that prevailing emissions are at least double these standards. For the purposes of this study, higher average current emission rates of pollutants have been used. See Table 12.

The source strengths computed in Table 12 are based on the present average vehicle emission rates. The average source strengths (mass of pollutant per foot of travel distance per second) were obtained by multiplying the number of vehicles per unit time by the emission rate for an average vehicle. For purposes of comparison, the normal peak hour traffic now along U.S. 101 is about 9,000 vehicles per hour, generating about 21/mg/ft/sec of carbon monoxide (to be reduced to 5/mg/ft/sec if projected standards are achieved). Thus, the

TABLE 12

PEAK HOUR EMISSIONS FROM FERRIES, AUTOMOBILES, AND BUSES IN SAUSALITO

Source	Emission Rates			
Automobiles[1] (On Bridgeway)	Vehicles per hour	CO	NO_x	HC
a. Existing	1300	4.44	0.34	0.34
b. Generated by terminal now, weekends	40	0.14	0.01	0.01
c. Generated by terminal now, weekdays	80	0.28	0.02	0.02
d. Generated by proposed operation, weekends	102	0.35	0.03	0.03
e. Generated by proposed operation, weekdays	160	0.55	0.04	0.04
Buses (On Bridgeway)[2]				
a. Weekdays	22	.028	.042	.002
b. Weekends	8	.010	.015	.001
Ferries[3]	Minutes	CO	SO_2	NO_x+ HC
a. In terminal, idling	15	3.8	0.32	0.7
b. On bay, full power	45	0.8	0.83	0.14

[1] Automobile emission rates, mg/ft/sec based on current average of 65 grams/mile for CO and 5 grams/mile for NO_x and HC. If projected rates are achieved, the source strengths shown will be reduced to about one-fourth.

[2] Bus emission rates: 25 gm/mi. of CO, 36.3 gm/mi. of NO_x and 1.65 gm/mi. of HC.

[3] Ferry emission rates, grams/sec, of carbon monoxide (CO), sulfur dioxide (SO_2), and of oxides of nitrogen and hydrocarbons (NO_x + HC). Based on fuel consumption of 600 lb./hr. during idling and 1,560 lb./hr. at full power; 0.2% sulfur content in fuel.

Source: Albert Miller, PhD.

slow-moving traffic along Bridgeway, between Richardson and Napa Streets during normal peak hours, produces pollutants at a rate equivalent to about 1000 feet of freeway. The traffic currently generated by ferry commuters now accounts for about 6 percent of this total, and would increase to 8 percent with the proposed ferry schedule. However, the average automobile trip distance of a ferry commuter is less than two miles, compared to 15 miles or more for the non-ferry user, going to San Francisco.

The emissions statistics for diesel buses are from General Motors Corporation, the manufacturer of all the Bridge District's buses (General Motors Corporation, 1972). Although CO, NO_x, and HC are principal emissions, other pollutants include sulfur oxides (1.65 gm/mile) and an insignificant amount of particulates. It is clear from a comparison of bus and automobile emissions that the total production of pollutants in Sausalito could be dramatically reduced if buses were to replace automobiles along Bridgeway. A combination of ferries and buses for transportation would also considerably reduce emissions over the region.

The source strengths given in Table 12 are used to compute air concentration levels in Section 4.1.5.

4.1.3 Ferry Emissions

The emission rates for ferries are based on figures supplied by the manufacturer of the engines (Avco Lycoming of Stratford, Conn.; diesel TF 35 engine). The emission rates of carbon monoxide, oxides of nitrogen, and hydrocarbons, when the ferry is idling, are equivalent to those of about 16 idling automobiles. The sulfur dioxide emission, under full power, is less than 0.2% of what an average oil-burning electric power generating plant or a petroleum refinery emits. The concentration of SO_2 leaving the stacks would be about 36 ppm when under full power and about 13 ppm when idling; the existing ambient SO_2 level is very low and even with addition of these small amounts, the air concentration should remain well below state and Federal standards. The particulate emissions (.00386 grams/ft^3, according to the engine manufacturer), will be well below allowed standards.

4.1.4 Effects on Climate and Air Pollution

The potential effects of developments on the atmosphere are of two kinds: (1) changes in the earth's surface properties that influence the energy exchange between the surface and the atmosphere, and thus produce changes in such parameters as the air temperature and air movement; (2) man-made emissions of heat and pollutants that can modify the climate may be harmful and/or unpleasant in themselves. This report will evaluate each of these effects that might result from the proposed development.

a. Atmospheric concentrations of pollutants

The atmospheric concentration of each contaminant at various distances from the source can be computed from the expected source strength data of Table 12 through application of Gaussian plume diffusion equations, and the carbon monoxide oxides, of nitrogen, and hydrocarbon concentrations downwind from the sources in Sausalito have been computed for the normal peak traffic hour, and the results at various distances downwind are presented in Table 13. The poorest dispersion is likely to occur in the early mornings of the fall or winter, which does not usually coincide with peak traffic in Sausalito. Nevertheless, computations were carried out for the cases when extreme meteorological conditions (poor mixing) coincide with peak traffic hours; such conditions are not likely to occur more than 15 percent of the time, even during the worst month (December), and not more than 4 or 5 percent of the time throughout the year. The results show that even under extreme conditions the effect of the downtown Sausalito traffic on the concentrations of pollutants at distances beyond 1000 feet downwind are undetectable and very small beyond 300 feet. The contributions of the ferries and terminal-generated traffic are undetectable beyond 50 to 100 feet.

The concentrations of pollutants right along Bridgeway during peak hour can be estimated, but it should be understood that these will represent averages, since there can be large point-to-point variations because of traffic and peculiarities of the wind flow. Under normal meteorological conditions (good disperson), the CO concentration should not exceed 2-3 ppm (ferry terminal traffic contribution is less than 0.2 ppm) and the concentration of NO_x should each be not more than .04 ppm (terminal contribution is much less than .01 ppm). However, under severe meteorological conditions (almost calm with little vertical mixing of the air), with peak-hour traffic, the CO concentration could reach 6 or 7 ppm (terminal contribution is less than 0.5 ppm) and the NO_x concentration 0.25 ppm (terminal contribution 0.02 ppm). Thus, the CO standard should never be exceeded within the downtown Sausalito area, although it may reach fairly high levels. NO_2 which usually comprises 60-80 percent of NO_x would also never exceed the established standard (0.25 ppm average over one hour).

The contribution of Sausalito traffic to the overall air pollution in the San Francisco Bay Area depends on the average distance driven to and from Sausalito. Assuming an average round-trip distance of 30 miles, driven at a speed of 50 mph, the added emissions have been computed to be 2.7 tons of NO_x. They represent less than 0.2 percent of the estimated current emissions in Marin and San Francisco Counties. It is estimated that the average round-trip of automobile traffic generated by the terminal is only three miles. It is clear that if the ferry does not increase the total number of travelers, a substantial decrease in total emission will result from use of the ferry.

TABLE 13

COMPUTED POLLUTANT CONCENTRATIONS (PPM) AT VARIOUS DISTANCES FROM SOURCE DURING PEAK HOUR TRAFFIC[1]

	Normal Meteorological Conditions		Severe Meteorological Conditions (Fall/Winter)	
Distance Downwind	CO	NO_x/HC	CO	NO_x/HC
Ferries				
300 ft.	<0.01	< 0.01	0.13	0.01
600 ft.	<0.01	<0.01	0.05	<0.01
1000 ft.	<0.01	<0.01	0.01	<0.01
Automobiles[2]				
300 ft.	0.01 (<0.01)	<0.01 (<0.01)	1.33 (0.11)	0.09 (<0.01)
600 ft.	<0.01 (<0.01)	<0.01 (<0.01)	0.47 (0.04)	0.03 (<0.01)
1000 ft.	0.01		0.32 (0.03)	0.02) (<0.01)
1 mile			0.04 (<0.01)	0.01 <0.01

[1] Mean hourly, above ambient levels.

[2] Total on Bridgeway; figures in parentheses contributed by ferry terminal generated traffic.

Source: Albert Miller, Ph.D.

b. Climatic effects

The concentrations of contaminants in the air discussed above are much too small to have a detectable effect on the climate. Effects due to surface changes are likely to be ten times greater in magnitude.

The heat island effect of cities and large paved areas such as airports is now well documented. At large paved airports in the San Francisco Bay Area, the air is heated on the average by at least 2-3 degrees F. and as much as 5-6 degrees F. on a clear day over surrounding areas. At the same time, the wind speed is typically 15 to 20 percent greater than over an adjacent city because airports are flat with relatively few obstructions.

In the case of the Sausalito Ferry Terminal, surface modifications are on such a small scale that climatic effects will be undetectable.

4.1.5 Conclusions and Summary

a. The regional impact on air pollution by ferries is considerably less than that of automobiles since the average automobile trip length (from origin to destination) is reduced by 90 percent or more.

b. Existing congestion of automobile traffic along Bridgeway produces large emissions of pollutants which can lead to high atmospheric concentrations near the roadway. Since buses carrying the same number of passengers would emit 10-15 percent as much as the automobiles, efforts should be made to supplant automobiles with buses in downtown Sausalito.

c. A most important Bay Area problem is that of air pollution generation in a region where the potential for high levels of contamination often is great. However, ferry operation and terminal-related traffic will produce a very small amount (less than 8 percent) of that already existing during peak hours.

d. The project will have an almost undetectable effect on the climate.

e. Because operations at the new temporary terminal equipped to serve the S-165 vessels would not be increased over present levels (see Section 1.4.3), no increased air quality impacts are expected, except for minimal differences in emission between the M.V. Golden Gate and the S-165.

4.2.0 BIOLOGICAL IMPACT

This section is based on a report, included in Appendix C, by Harvey, Hartesveldt, Heath and Stanley, ecological consultants.

4.2.1 General

Although each of the categories of biota described in Section 2.2.0 will suffer some negative impact during the construction phase of the project, it is unlikely that significant impairment will result in the long run. There are several other criteria and factors that lead to this conclusion:

First, the area in question is devoid of either marshland or mud flat habitat. Although shallow waters and deep waters of the Bay are significant habitats for many species, they are in no way threatened with destruction to the degree that marshes are threatened. This project, particularly, is largely a question of modification, rather than total destruction.

Second, no rare or endangered species are known to depend on the ecosystems within the site. The potential species of concern, the salt marsh harvest mouse, the clapper rail and the least tern are not known to occur and would not be expected to occur in the area.

Third, anadromous fish migration through Richardson Bay is minimal and the project would impede movement very minimally, if at all.

As indicated earlier in Section 2.2.0, wildlife values are considered to be only fair, with few fish or waterfowl species heavily depending on this area. Only the potential of herring spawning would seem a relevant fact. There is also no indication that this is an important site for shellfish or game fish.

In conclusion, it appears that minimal damage will be done to the native biota by the proposed development. However, it should be noted that if maintenance dredging and disposal of the spoils were required, this would result in a renewing problem.

Because the new temporary terminal to serve the S-165 vessels will have essentially the same physical characteristics as the existing facility, no biotic impacts are expected from this new facility, either at its initial location or relocated approximately 80 feet south, while the permanent terminal is under construction.

4.2.2 Benthic Species

If there is maintenance dredging, it will disturb the benthic species known to inhabit the site. It is unlikely that much of a long-range effect will be noted. First, the area is relatively small and it is highly probable that the area will be rapidly invaded by the same species from the adjacent environment. It is difficult to predict what the population densities of the various forms would be after dredging.

4.2.3 Fish

The proposed development will probably alter the fish population very little, inasmuch as some pilings (the old ferry slip) will be removed and new ones added. There would be little impact on spawning areas of the Pacific herring if the rocky shoreline is not altered.

4.2.4 Birds

Because of the limited size of the project area and the few habitats and present high human activity, it is unlikely that the number or species of birds that are present would be measurably affected.

4.2.5 Plants

Due to their ubiquitous nature and rapid means of propagation, it seems highly probable that though some disruption of aquatic plants would occur during the construction phase, recovery would be rapid and plant life would eventually be much as it is at present.

4.3.0 GEOLOGIC AND SOILS IMPACT

This section is based on the Cooper-Clark & Associates report in Appendix D.

4.3.1 Topography

This project will not affect the topography, since the proposed structure will be on piles, no dredging is planned, and no on-shore grading or paving will be done.

4.3.2 Geology

The project will have minimal impact on the site geology. With appropriate soil engineering, it also appears that the geology will have minimal impact on the project. The investigations did not reveal the presence of a fault on the site.

4.3.3 Seismology

The project will have no impact on the site's seismic characteristics. The regional seismicity of the area could result in severe ground shaking at the site. To the extent that the past reflects what may happen in the future, it appears that the following earthquakes could occur within 80 miles of the site during the next 150 years:

Number of Earthquakes	Richter Magnitude
1	7.5 to 8+
4	6.5 to 7.5
26	5.5 to 6.5
160	4.5 to 5.5

4.3.4 Soils

The static strength of the on-site soils appears to exceed the shear stresses that would be induced even during the major earthquake. Consequently, there is minimal potential for major, seismically-induced ground failures. There does, however, appear to be some potential for the development of cracks in the existing fill. Also, analyses indicate that the pile-supported bulkhead should undergo serious distress during a major earthquake. However, as mentioned previously, this bulkhead survived the great 1906 earthquake without damage.

This project may result in some minor disturbance of bay mud and underlying soils by pile driving. Existing soil characteristics will have a significant impact on the proposed construction, and careful analysis of dynamic soil-pile interaction is necessary to properly design the piles to withstand seismically-induced lateral deflections of the individual soil layers. Such design is in progress. Soil stability is, to a certain extent, dependent upon the stability of the existing bulkhead which serves as a retaining structure. The calculated stability of the bulkhead should be improved and/or the proposed structure should be designed so that it would not be adversely affected by deflections or failure of the bulkhead under earthquake forces.

4.3.5 Summary

The potential impacts of the proposed project and the existing physical environment include both possible and theoretical factors:

Possible impacts include:

1. A tsunami water wave similar to the one generated by the 1964 Alaskan earthquake would reach a possible maximum elevation of 12.6 feet (MLLW) during high tides; the dock elevation will be 14 feet (MLLW), and thereby not be affected. However, the highest anticipated water wave, which has an estimated frequency of one every 200 years, could reach a height of 22 feet, which would overtop and could seriously damage the structure.

2. A remote possibility that submarine currents and erosion-siltation patterns may be minimally altered, possibly affecting the nearby boat channel.

3. Ground cracking during a major earthquake.

4. Failure of the existing bulkhead.

5. Major earthquakes in the area would result in strong ground shaking at the site and could adversely affect the pile foundations and the superstructure.

Theoretical impacts could include:

1. A seiche could develop due to a local seismic event or major landslide into the Bay near the site. Limited data indicate that the maximum anticipated height of such a seiche would be less than 7 feet, which should not affect the structure.

2. Differential settlement.

3. Potential offshore faulting along a concealed fault.

4.4.0 HYDROLOGIC IMPACT

This project will have minimal impact on surface or groundwater conditions.

The main Sausalito boat channel is located adjacent to this proposed site. Pier construction may minimally affect local tidal currents and, therefore, theoretically affect the boat channel, and/or change the erosion-sedimentation characteristics of the immediate area. These questions are as yet unanswered and will be determined prior to final construction.

4.5.0 ACOUSTIC IMPACT

4.5.1 Traffic Noise Impact

As described in 5.5.0, Transportation Impact, weekday peak hour traffic on Bridgeway could increase from about 1300 to 1450 vehicles per hour, and from 1150 to 1450 vehicles per hour during weekend peak periods, according to Wilsey & Ham studies. This could increase decibel levels of 50-55 dBA of existing traffic at 100 feet from the roadway by 2 or 3 dBA. These traffic generation figures are based on full capacity assumptions for ferry patronage, Actual patronage and resulting traffic noise levels are likely to be lower. Existing traffic noise is described in Section 2.5.2. This several decibel increase would not be considered a significant impact.

4.5.2 Ferry Noise Impact

Noise impact of the Spaulding 165 ferries is based on data provided by the Bridge District and Philip F. Spaulding Associates, designers of the vessels. The first of the S-165s are expected to be operational by late 1974, and some revision of actual noise output data could be made at that time.

Maximum noise output is projected to 85 dBA at 50 feet from the after portion of the vessel, and is assumed to be projected primarily 60 degrees on either side of the center line. Sound levels would be attenuated in other directions. Since the ferries will normally operate with stern away from downtown Sausalito, actual noise levels experienced in Sausalito would be lower, on the order of 70-75 dBA at 100 feet from the vessel. See Figure 7.

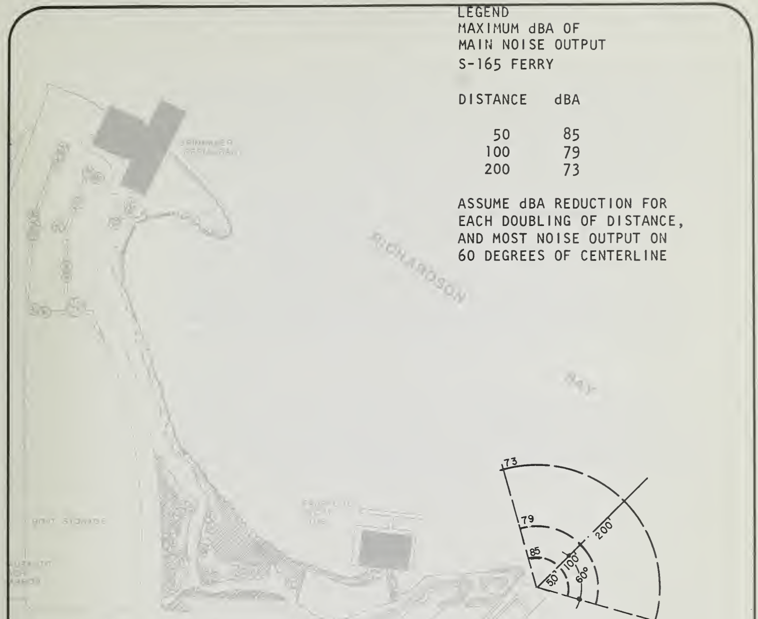
4.5.3 Construction and Operational Noise

a. Construction

Construction noises would result from both on-site and off-site activities. On-site noises generated by various construction equipment could include pile drivers, pneumatic impact equipment, and electric power tools. Off-site activities would consist primarily of truck traffic to and from the site.

Acoustic impact from on-site construction activity will generally come from pile driver operations (approximately 95-105 dBA at a 50-foot radius) and single-event noises, such as power saws (93-102 dBA at a 50-foot radius) distances.

Since it is assured that all construction activity will occur during daytime hours, the "interference-with-speech" level beginning at 67 dBA (minimum impact) is used as a reference point for estimating the probable impacts from construction noises.



LEGEND
MAXIMUM dBA OF
MAIN NOISE OUTPUT
S-165 FERRY

DISTANCE	dBA
50	85
100	79
200	73

ASSUME dBA REDUCTION FOR EACH DOUBLING OF DISTANCE, AND MOST NOISE OUTPUT ON 60 DEGREES OF CENTERLINE

sausalito ferry terminal EIR
PREPARED BY:
Wilsey & Ham

PROJECTED NOISE IMPACT-
SPAULDING 165

SOURCE: Golden Gate Bridge,
Highway & Transportation District

FIGURE 7

High-frequency, single-event noise, such as power saws, will have greater impact than low-frequency, single-event noise, since the higher frequencies are more disruptive to conversation. Residential areas typically have a normal ambient noise level of 45-53 dBA, with occasional peaks of 65 dBA from common activities, such as sounds from children playing. The allowable noise level for steady duration noises that would not interfere with speech inside residences is approximately 54 dBA. (54 dBA is approximately the sound level of a radio inside the home at moderate volume). Therefore, considering the existing noise levels and distances, residential areas are not apt to be affected above acceptable levels from on-site or off-site construction noises, and noise levels would be reduced with increasing distance from the project.

b. Operational

Tables 1 through 4 of Section 1.4.0 outline the present and proposed ferry scheduling. Presently, no adverse noise impact on adjacent human activities is being experienced. The noise increment from proposed expansion of service is judged to be insignificant.

4.6.0 VISUAL IMPACT

The proposed Sausalito Ferry Terminal design is basically a triangular facility pier extending east about 200 feet into San Francisco Bay. This pier would have a boarding float, paid waiting area, other landscaped public and a small one-story ticketing, restroom and employee facility. Other than this structure, no part of the terminal would be as high as one story, and existing views from the downtown area of Sausalito should not be impaired.

Public access to the terminal would actually provide area for less obstructed views of Richardson Bay in the immediate vicinity, and San Francisco Bay to the south. The removal of the existing unused ferry dock piling could also be considered a beneficial visual impact.

When a Spaulding 165 ferry is at the terminal, it would be somewhat more visually prominent than the M.V. Golden Gate. (The new vessels would be 165 feet long, compared to 113 feet of the existing ferry.) The overall height of the superstructure of both vessels is similar, though, and any adverse impacting of views by the presence of the new vessel at Sausalito would be limited to time in port. In general, there would be no adverse visual impacts.

4.7.0 IMPACTS OF TEMPORARY TERMINAL

The temporary terminal that would be provided to accommodate the S-165 vessels at the existing ferry terminal location would be moved 80 feet south during construction of the permanent facility.

These activities would not have significant impact on the atmospheric, biotic, geologic, or hydrologic environment. There is potential short-term impact in two areas: acoustic and visual.

The acoustic conditions created by the new ferries (Section 4.5.0) would occur somewhat closer to residential areas on the waterfront south of the terminal. Potential noise levels could be 70-75 dBA during ferry operations at the relocated temporary terminal near these residences. This is somewhat higher than U.S. Department of Housing and Urban Development criteria for residential uses. Thus, relocation of the temporary terminal would entail some adverse acoustic impact occurring only during ferry operations at the terminal and only during construction of the permanent facility.

Because the ferries will dock closer to the residences mentioned above, there will be some visual impact on views from these units. Because the temporary terminal will be removed when the permanent terminal is completed, this impact cannot be considered significant.

5

SECTION 5.0.0
IMPACTS ON THE SOCIAL, ECONOMIC, AND MAN-MADE ENVIRONMENT

5 SECTION 5.0.0
IMPACTS ON THE SOCIAL, ECONOMIC, AND MAN-MADE ENVIRONMENT

5.0.0 IMPACT ON SOCIAL, ECONOMIC, AND MAN-MADE ENVIRONMENT

5.1.0 GOVERNMENT POLICIES

5.1.1 Local Government Policies

a. Golden Gate Bridge, Highway and Transportation District (GGBHTD)

The proposed project is an expression of the policies and plans of the Bridge District. The Bridge District will not undertake construction of the terminal until the final EIR is accepted.

b. City of Sausalito

Although the proposed terminal is inconsistent with some of the adopted city motions and resolutions, State law would permit the Bridge District to carry out the project regardless of these inconsistencies.

c. Marin Municipal Water District (MMWD)

The project's water supply requirements may conflict with the Marin Municipal Water District's Ordinance No. 121 that prohibits certain types of new water service. The proposed terminal could require a variance by the MMWD to increase its water consumption over present levels.

5.1.2 County Government Policies

a. Marin County

The proposed ferry terminal is consistent with Marin County policies and plans.

b. City and County of San Francisco

The ferry terminal project is compatible with the policies of the City and County of San Francisco.

5.1.3 Regional Government Policies

a. San Francisco Bay Conservation and Development Commission (BCDC)

The project conforms to BCDC's San Francisco Bay Plan (1969). Before the development of the new terminal may begin, a BCDC permit must be obtained.

b. Association of Bay Area Governments (ABAG)

The proposed ferry terminal generally conforms to ABAG's Regional Plan 1970-1990 (ABAG, 1970).

c. Metropolitan Transportation Commission

The project is consistent with the Metropolitan Transportation Commission's policies and plans.

d. Bay Area Air Pollution Control District (BAAPCD)

At this time, no BAAPCD permits would be required for terminal completion.

5.1.4 State Policies

a. State Legislature

The Bridge District's proposed development and operation of the ferry terminal is consistent with California law.

5.1.5 Federal Policies

a. U.S. Department of Transportation, Urban Mass Transportation Administration (UMTA)

Upon UMTA's approval of the project, they will finance 66-2/3 to 80 percent of the cost of the project and new ferries.

b. U.S. Army Corps of Engineers

A U.S. Army Corps of Engineers regulatory permit would be required to develop the piers and docks of the project.

c. U.S. Coast Guard

The ferry terminal and the Spaulding 165 ferryboats will be constructed to meet the Coast Guard enforced Code of Federal Regulations. It is the responsibility of the Coast Guard to inspect the new ferryboats and terminal before the project becomes operational.

5.2.0 IMPROVEMENTS

In order to develop the project, the Bridge District will lease or purchase the portions of the site that they are not now currently leasing. The extent of the area to be leased is the same as shown in Figure 3, Sausalito Ferry Terminal Plan.

5.3.0 PUBLIC UTILITIES

5.3.1 Water

The proposed expanded ferry service at Sausalito may increase the water demand on the Marin Municipal Water District. Table 14 outlines the Sausalito ferry system utility demands for existing and projected consumption. As shown in the table, project consumption on an average day would be 170 gallons of water, and on a peak day, consumption would total 735 gallons. This represents a 15 percent increase over existing consumption for an average day and a 29 percent increase for a peak day. Combined consumption for existing water use and projected water use totals 1270 gallons on an average day and 3235 gallons on a peak day.

As previously discussed in Section 3.4.1, the Marin Municipal Water District has a moratorium on new or expanded water services. The project's increased water demand, therefore, would require a variance approval by the district's Board of Directors or an alternative source of water.

5.3.2 Natural Gas and Electricity

Proposed expansion of the ferry system at Sausalito would have a minimal impact on electrical consumption. The expanded ferry service would have no impact on natural gas, since neither the terminal nor the ferryboats require this particular energy source.

Table 14 outlines the various utility demands of the proposed project in quantitative terms. As indicated in the table, electrical consumption would be increased over existing usage. On an average daily consumption basis, the increase would fall somewhere between zero to 100 percent. Consumption on a peak day would result in a 100 percent increase.

Pacific Gas and Electricity district representatives have expressed the utility's ability to support increased electrical demand.

5.3.3 Fuel

The proposed project would serve to increase the overall amount of diesel fuel consumed in the San Francisco Bay Area.

As indicated in Table 14, diesel fuel oil consumption would increase by 600,000 gallons annually. In terms of the total diesel oil consumed in the San Francisco Bay Area for 1972 (latest data available), the project-induced increase would

TABLE 14

UTILITY DEMAND
SAUSALITO FERRY SYSTEM

UTILITY	Existing Consumption/Generation		Project Consumption/Generation		Combined Consumption/Generation		Percent Project Increase/Decrease Over Existing Consumption/Generation	
	Average Day	Peak Day	Average Day	Peak Day	Average Day	Peak Day	Average Day	Peak Day
Water[a] (Gal.)	1,100	2,500	170	735	1,270	3,235	15	29
Sewage[b] (Gal.)	650	2,000	100	300	200	600	-85	-84
Electricity[c] (Kw.-Hrs.)	1*	1-2*	1-2	2-3	2-3	3-5	0-100	100
Solid Waste[d] (lbs.)	580	750	620	1,050	1,200	1,800	7	40

	Annual	Annual	Annual	Annual
Diesel Fuel #2[e] (Gal.)	200,000	-	200,000	-
Diesel Fuel #1[e] (Gal.)	-	600,000	600,000	-

---

*Estimate

a/ Total water demand is an aggregate of vessel washdown water, potable water (drinking water consumed aboard vessel and at terminal) and water used to washdown ferry terminal float. Water used for vessel washdown is proportional to vessel length; water for human consumption is proportioned to number of passengers; water used for washdown of terminal float is assumed constant.

b/ Total sewage generation is that which is generated aboard ferryboat and at terminal and is proportional to the number of passengers.

Sewage will be reduced substantially as there are plans to install a low water use toilet in the MV Golden Gate; the S-165s and new terminal are assumed to be designed with the low water use toilets.

c/ Total electrical demand is that which results from use of an outside light while the vessels are loading and unloading during hours of darkness and is proportional to the number of trips scheduled during hours of darkness.

d/ Total solid waste generation is an aggregate of waste generated at parking lot adjacent to ferry terminal and waste generated aboard ferry boats and is proportional to number of passengers.

e/ Total diesel fuel demand is that which is used as an energy source for propulsion of the ferryboat. Annual consumption figures are estimates provided by the Golden Gate Bridge, Highway and Transportation District.

SOURCE: Golden Gate Bridge, Highway and Transportation District; Bay Cities Refuse Service Incorporated; Wilsey & Ham

serve to increase the Bay Area demand by .25 percent (Bay Area Air Pollution Control District). However, since an undetermined number of ferry patrons would be diverted from private auto use, there would be a trade-off in overall fuel consumption because of reduced auto usage in the Golden Gate Corridor.

5.3.4 Sewage

As previously discussed in Section 3.4.4, the Bridge District presently has plans to install a low water use toilet in the M.V. Golden Gate. This conversion would reduce existing sewage generated on an average day by 550 gallons to a new level of 100 gallons and reduce the peak day generation from 2,000 gallons to 300 gallons. See Table 14.

When the project is completed, the total sewage produced with full service on average and peak days would be substantially less than existing sewage generated by the M.V. Golden Gate.

5.3.5 Solid Waste

The expanded ferry service at Sausalito would increase solid waste generation. As shown on Table 14, project-induced solid waste would increase by seven percent on an average day and by 40 percent on a peak day. This is an increase of 620 pounds of solid waste on an average day and 1,050 pounds on a peak day. Combined solid waste generated (existing and projected) would total 1,200 pounds on an average day and 1,800 pounds on a peak day.

5.4.0 IMPACT ON THE TRANSPORTATION ENVIRONMENT

Transportation impact is evaluated on the basis that the proposed ferry terminal will be in operation by spring, 1976. The evaluation is based upon the maximum impact situation in which the ferry patronage per run is equal to the capacity of the Spaulding 165. Three areas of major concern are addressed:

a. The local weekday and weekend peak hour impact;

b. The relationships between the proposed terminal and other changes;

c. The impact of the proposed terminal on the larger transport environment. (See Appendix E for a full report on transportation impact.) The data and conclusions of this section are based on detailed assumptions and data documented in Appendix E. This Appendix should be referred to for further clarification of Section 5.4.0.

5.4.1 Local Impact

The evaluation of impact is based upon the assumption that no changes on the existing local environment will be made between now and the completion of the proposed ferry terminal. The following discussion is primarily concerned with peak hour impacts:

a. Weekday Conditions (Monday Through Friday)

The proposed ferry schedule calls for the operation of two ferries, one of which could be the existing M.V. Golden Gate, during the service period of 10:00 a.m. to 4:00 p.m. Before 10:00 a.m. and after 4:00 p.m., one vessel would operate on the current schedule. Since no changes in land use and ground transportation systems in Sausalito are assumed, the downtown peak traffic would occur at least between the hours of 4:00 p.m. and 6:00 p.m. As the traffic characteristics can better be described in hourly terms, 4:00 to 5:00 p.m. was selected for the analysis with the understanding that the impacts thus generated would generally be applicable to other peak hours. During this period, ferry runs are assumed to be conducted by Spaulding 165 vessels.

A summary of existing and possible peak hour impacts is presented in Table 15. Case I describes the impact of the existing system in terms of the travel time delay experienced by motorists in the downtown area. Case II discusses the impact on vehicular traffic when the proposed system is operated at capacity. Case III considers the implications of hypothetically employing the existing system to meet an increased travel demand. In both Cases II and III, certain amount of local traffic delays can be expected as a result of additional vehicles generated.

TABLE 15

SUMMARY OF WEEKDAY PEAK HOUR IMPACT - SPRING, 1976

	CASE I	CASE II	CASE III	REMARKS
Type of Ferry Terminal System	Existing System	Proposed System	Existing System	Case III is a "no project" alternative
Type of Vessel	M.V. Golden Gate	Spaulding 165	M.V. Golden Gate	
Patronage Level	Existing level	At Capacity	At Capacity of (a) Spaulding 165	
Total Peak Hour Demand	669 Passengers	2,250 Passengers	2,250 Passengers (b)	
Number of Vehicles Generated On Bridgeway (d)				
North of Terminal	72	228	288 (c)	
South of Terminal	20	100	210 (c)	
Additional Vehicles Generated on Bridgeway (Both Directions):				
North of Terminal	0	156	216(191)	( ) denotes downtown inbound traffic volumes
South of Terminal	0	80	190(182)	
Additional Travel Delay Experienced by Bridgeway Motorists (in minutes):				
North of Terminal	0	7.8	19.1	Assuming each signalized intersection can accommodate 10 vehicles per lane per minute.
South of Terminal	0	4.0	18.2	
Total Travel Time Experienced by Bridgeway Motorists Between Johnson and Princess Streets (in minutes):				
North of Terminal	2.0	9.8	21.1	Including delay caused by traffic signals. Existing data from Schoonmaker EIR Traffic Impact, Feb. 8, 1974
South of Terminal	2.5	6.5	20.7	

Source: Wilsey & Ham

(a) The capacity of S-165 vessel is assumed to derive hypothetical total patronage. This patronage level could not be physically accommodated with M.V. Golden Gate. See Note (b).

(b) Including ferry patrons and those who must use other transport modes to downtown Sausalito.

(c) Including both one-way and two-way traffic generated.

(d) All the vehicular traffic figures presented here together with their associated assumptions can be found in Tables 12, 13 and 14 in Appendix E.

b. Weekend Conditions (Saturdays, Sundays, and Holidays)

According to the proposed ferry schedule, two vessels, one of which could be the existing M.V. Golden Gate, will exclusively operate between San Francisco and Sausalito. After 6:00 p.m., only one vessel will operate. This analysis assumes all runs will be made by Spaulding 165 ferries.

A summary of existing and possible peak hour (1:00 to 2:00 p.m.) impacts is presented in Table 16. This table describes the number of pedestrians in downtown and the impact of pedestrians on vehicular traffic. Under the existing condition, pedestrians who arrive by ferry account for about 20 percent of the travel time delay for motorists on downtown Bridgeway. With the implementation of the proposed ferry system, additional delays would be caused by pedestrians who are ferry passengers. However, in the event that the existing system accommodates increased patronage demand, the vehicular traffic delay on Bridgeway would be similar to that generated by the proposed ferry system. In addition, nearly 300 more vehicles would be generated in the peak hour, creating more vehicle-pedestrian conflicts and a higher demand for parking spaces. This number of vehicles generated, it should be emphasized, is based on the Case III hypothesis of increased demand on the existing ferry system. Not all these vehicles would be generated if the proposed system is implemented with increased capacity.

5.4.2 Proposed Ferry Terminal System and Environmental Changes

The previous analysis was based upon the maximum impact situation in which the demand is equal to the capacity of the ferry service, and assumed no environmental changes in Sausalito. This assumption of ridership demand at capacity is made to project the maximum potential impact of the ferry service, and actual demand and resulting impacts could be lower. Between the assumed maximum and present demand, there exists numerous patronage levels causing different degrees of local transportation impacts. The extent of future ferry impact hinges on two central issues--the overall demand for transportation services in Sausalito and the manner in which Sausalito handles this demand. Both issues seem to relate closely to the extent, timing, location, and developments which are governed by emerging political and economic decisions. In the absence of an identifiable future local transportation system and service levels against which relative significance of the ferry terminal system impacts can be measured, system impacts have been developed as above.

TABLE 16

SUMMARY OF WEEKEND PEAK HOUR IMPACT - SPRING 1976

	CASE I	CASE II	CASE III	REMARKS
Ferry System Characteristics	Existing System	Proposed System	Existing System	
Type of Vessel	M.V. Golden Gate	Spaulding 165	M.V. Golden Gate	
Patronage Level	Existing Level	At Capacity	At Capacity of Spaulding 165 (a)	Similar ferry patronage for Case II and III
Number of Ferry Passengers Accumulated in Downtown (b)	582	1,500	582	
Number of Additional Vehicles Generated on Bridgeway:				
North of Terminal	0	0	138	Downtown inbound vehicles only.
South of Terminal	0	0	147	
Number of Additional Parking Spaces Required	0	0	285	Assuming all Vehicles will park.
Travel Time Delay on Downtown Bridgeway Caused By Pedestrian Traffic (In minutes):				
Northbound Traffic	3	3.8	3.8	From Table 18 in Appendix E
Southbound Traffic	6	7.5	7.5	
Travel Time Delay Caused by Additional Vehicles (in minutes):				
Northbound Traffic	0	0	13.8	Assuming each signalized intersection can accommodate 10 vehicles per lane perminute
Southbound Traffic	0	0	14.7	
Total Travel Time Delay (In minutes):				
Northbound Traffic	3	3.8	17.6	
Southbound Traffic	6	7.5	22.2	

Source: Wilsey & Ham

(a) The capacity of S-165 vessel is assumed to derive total patronage. This patronage level could not be physically accommodated with M.V. Golden Gate. Potential ferry patrons must use land transport modes to downtown Sausalito.

(b) All pedestrian traffic figures presented here together with their associated assumptions are found in Table 18 of Appendix E.

5.4.3 Implications of the Proposed Ferry Terminal System Upon the Larger Transport Environment

From locational and operational standpoints, the system is consistent with Marin County policies, emphasizing transit. See Section 5.1.2. The development of the proposed system would allow ferries to operate among San Francisco, Larkspur, and Sausalito terminals while at least maintaining the existing level of service to Sausalito. Further improvement in county transit could reduce the need for automobile ownership and result in a higher demand for transit services. The proposed ferry terminal system tends to contribute to a more desirable transit system in which the land transit improvement is balanced with that of water transit.

The Metropolitan Transportation Commission has identified the ferry system as bearing regional transportation significance. Generally, the Commission's policies advocate a substantial development in transit systems. The proposed system will further improve the extent to which the regional transport objectives are met, resulting in a reduction of auto usage along one of the region's heavily traveled corridors. See Section 5.1.3.

5.5.0 ECONOMIC ACTIVITY AND EMPLOYMENT

Expansion of the Sausalito-San Francisco ferry service by the Bridge District will generate certain specific and general impacts on Sausalito's economy and employment profile. Because the project is a transportation system facility, an evaluation of these questions is relatively straightforward. That is, the terminal itself and the increased level of transportation service warrants the examination of the following three questions:

a. What areas of impact will be brought about by the Ferry Terminal and service expansion?

b. What are the expected changes in characteristics of the ferry operation after expansion?

c. How does this affect Sausalito's economy and employment, directly and indirectly?

Evidence exists to show that the relationships between transportation terminals and an urban economy are predominantly in four areas of impact: (1) pressures for residential locations adjacent to the facility, line, station, etc.; (2) increased spending for goods and service by patrons of the transportation; (3) a concurrent shifting land use pattern with the facility as the focal point; and (4) the "congestion" aspects, both negative and positive.

Analysis of this element begins by examining the present and possible future service levels of the ferry operation.

There are several options as to the actual ferry system service to be effectuated to and from the Sausalito Ferry Terminal. The following three alternatives presently exist:

a. Predominant use of the existing M.V. Golden Gate (Max. capacity 575 passengers).

b. Predominant use of Spaulding 165 vessels (Max. capacity 750 passengers).

c. A combination of M.V. Golden Gate and S-165 service.

Looking at weekday operation alternatives (See Table 17), possible vessel utilization in various arrival/departure schedules results in the following: (1) maximum passenger arrivals/departures of 9,325 riders--using the Golden Gate and one S-165; (2) a maximum capacity of 10,550 riders each way with extensive use of the S-165; and (3) a maximum capacity of 11,250 each way with maximum S-165 service. This maximum range of 9,325-11,250 arrivals to Sausalito daily compares with full capacity of some 6,325 arrivals and 5,750 departures daily under the present schedule utilization (June to September peak service).

TABLE 17

HYPOTHETICAL WEEKDAY FERRY SYSTEM PATRONAGE, MAXIMUM LOAD
SAUSALITO TERMINAL

		Expanded Service Alternatives		
	Existing Service[1]	2 Vessels[2]	2 Vessels[3]	2 Vessels[4]
Number of Ferries	1	2	2	2
Trip Passenger Capacity	575	575-750	575-750	750
Scheduled Arrivals per day @ Terminal	11	15	15	15
(Maximum) Daily Passenger Arrivals	6,325	9,325	10,550	11,250
Scheduled Departures per day @ Terminal	10	15	15	15
(Maximum) Daily Passenger Departures	5,750	9,325	10,550	11,250

---

[1] M.V. Golden Gate only

[2] M.V. Golden Gate 11 trips, S-165 4 trips

[3] M.V. Golden Gate 4 trips, S-165 11 trips

[4] Full S-165 Service

Sources: GGBHTD, LeBlanc & Company

This assumption of ridership demand at capacity is made to project the maximum potential impact of the ferry service, and actual demand and resulting economic impacts are likely to be lower.

For weekend/holiday operations, the following may result: (1) a combination of the Golden Gate and S-165 vessels could deliver 8,350 patrons to Sausalito and remove 8,925; (2) S-165 vessels only would provide for 9,750 arrivals and 10,500 departures; and (3) the existing service at capacity could provide for 4,600 arrivals and departures each weekend day or holiday. See Table 18.

To translate these service alternatives to visitor levels, Tables 19 and 20 illustrate calculations of potential visitors (i.e., nonresidents) to Sausalito under existing and expanded service alternatives. For instance, full use of the Golden Gate could provide for 6,325 daily arrivals (weekday schedules). Estimates for weekday commuter patronage would account for about 7 percent of total capacity (or 460 daily), and pleasure visitors the remainder (5,865 passengers). These counts include estimated nonresident passenger arrivals only (commuter totals are estimated to be roughly split 50-50 between residents and nonresidents).

This methodology has been employed in all the visitor level projections contained in Tables 19 and 20. A close examination of the figures shows that:

- At maximum existing capacity, weekday visitation to Sausalito could reach a level of 6,325 riders (5,865 visitors); and the weekend/holiday level some 4,600 passengers (4,485 pleasure visitors).

- Expanded service alternatives, again at maximum capacity and patronage, could provide for a range of 9,325-11,250 weekday visitors (8,865-10,650 visitors).

- The weekend range would total 8,350-9,750 visitors (with a visitor capacity range of 8,235-9,600 passengers).

Differentials between weekday and weekend/holiday levels exist primarily to reflect (1) slightly different trip scheduling, and (2) dropoff in commuter trips on weekends and holidays--thus increasing potential capacity for "other" visitors.

Table 21 provides a summary of the maximum levels of visitation to Sausalito under the various assumptions.

One certain (and relatively identifiable) aspect of ferry operation is the total impact of additional passengers, and particularly visitors on Sausalito's commercial economy.

TABLE 18

HYPOTHETICAL WEEKEND/HOLIDAY FERRY SYSTEM PATRONAGE, MAXIMUM LOAD
SAUSALITO TERMINAL

	Existing Service[1/]	Expanded Service Alternatives	
		Combined Vessels[2/]	S-165 Only
Number of Ferries	1	2	2
Trip Passenger Capacity	575	2,075	2,250
Scheduled Arrivals per day @ Terminal	8	13	13
(Maximum) Daily Passenger Arrivals	4,600	8,350	9,750
Scheduled Departures per day @ Terminal	8	14	14
(Maximum) Daily Passenger Departures	4,600	8,925	10,500

[1/] M.V. Golden Gate only.

[2/] M.V. Golden Gate and S-165 service capacities combined.

Source: GGBHTD, LeBlanc & Company

TABLE 19

POTENTIAL (MAXIMUM) NON-RESIDENT WEEKDAY VISITATION TO SAUSALITO AT VARIOUS FERRY SYSTEM SERVICE LEVELS

	Service Alternatives			
	Existing Service	2 Vessels[3]	2 Vessels[4]	2 Vessels[5]
(Maximum) Daily Passenger Arrivals	6,325	9,325	10,550	11,250
Estimated Evening Commuter Arrivals[1]	(460)	(460)	(530)	(600)
Other Daily Visitor Arrivals[2]	(5,865)	(8,865)	(10,020)	(10,650)
Total Daily Visitors to Sausalito - Maximum	6,325	9,325	10,550	11,250

---

[1] At 40 percent of peak hour vessel capacity.

[2] Residual capacity.

[3] M.V. Golden Gate 11 trips, S-165 4 trips

[4] M.V. Golden Gate 4 trips, S-165 11 trips

[5] Full S-165 service

Source: LeBlanc & Company

TABLE 20

POTENTIAL (MAXIMUM) NON-RESIDENT WEEKEND/HOLIDAY VISITATION TO SAUSALITO AT VARIOUS FERRY SYSTEM SERVICE LEVELS

	Service Alternatives		
	Existing Service	Combined Vessels[3/]	S-165 Only
(Maximum) Daily Passenger Arrivals	4,600	8,350	9,750
Estimated Evening Commuter Arrivals[1/]	(115)	(115)	(150)
Other Daily Visitor Arrivals[2/]	(4,485)	(8,235)	(9,600)
Total Daily Visitors to Sausalito - Maximum	4,600	8,350	9,750

[1/] At 10 percent of peak hour vessel capacity.

[2/] Residual daily capacity

[3/] M.V. Golden Gate and S-165 service capabilities combined

Source: LeBlanc & Company

TABLE 21

MAXIMUM RANGES OF VISITATION TO SAUSALITO, VARIOUS SYSTEM SCHEDULING AND SERVICE LEVELS

	Probable Daily Visitation Levels[1]	
	Existing Service at Capacity	Expanded Service Alternatives
Weekday Ferry Operations	6,325	9,325 - 11,250
Commuters	(460)	(460) - (600)
All Others	(5,865)	(8,865) - (10,650)
Weekend/Holiday Ferry Operations	4,600	9,850 - 11,250
Commuters	(115)	(115) (150)
All Others	(4,485)	(8,235) - (9,600)

---

[1] From Tables 19 and 20

Source: LeBlanc & Company

In order to attempt an assignment of relative impacts of this type strictly to ferry operations (as opposed to impacts from other sources), a series of hypothetical cases have been developed whereby visitors to Sausalito bring about measurable changes in the commercial sector.

Since no empirical evidence related to the current impact of Sausalito visitors exists (such as measures of spending at a given point), a range of expected visitor expenditures in Sausalito is illustrated in Table 21. This computation utilizes the ranges of maximum weekday and weekend visitation (commuters and all others) previously developed. Total spending is viewed as a function of average purchases per person, per visit.

Further, Table 22 shows the possible distribution of visitor spending to the categories most likely to receive the benefit of this increased visitation to Sausalito: shopper or comparison goods (apparel stores, jewelry, trinkets, art, etc.); and eating and drinking (fast food, cocktail lounges, restaurants). Some convenience goods spending (drug and food market sales) might be registered, but it would probably be a negligible amount.

Selecting ranges of expenditure per passenger is difficult, particularly since the types of visitors to Sausalito differ so widely (among commuters, young people, families, tourists, others). Selecting an average expenditure (per visitor) range of $0.50 to $2.50 daily would provide for those who spend nothing; those who buy specialty goods while in Sausalito; and those who spend much more than the average.

At this point, the primary interest is in converting potential visitor purchases to development pressure on Sausalito's commercial structure and development potential. Table 23 converts commercial sales volumes in Table 22 into square feet of supportable commercial floor area (calculated at sales per square foot performance ratios of a "highly probable" category).

These development potentials would be realized to the extent that Sausalito's current inventory of retail store and restaurant outlets have underutilized sales capacity (an unknown factor). Naturally, if various shops or restaurants in Sausalito could substantially increase sales, development pressure from ferry visitor spending alone might well be absorbed. However, assuming that no potential exists in the current inventory, then ferry patrons could support a range for 11,000-55,000 square feet of retail shops and 6,000-27,000 feet of eating and drinking space.

At present, it is estimated that Sausalito contains nearly 250,000 square feet of retail comparison goods, eating, and drinking, and convenience commercial space. The bulk of this (approximately 150,000 square feet) is concentrated in Central Sausalito and in the Caledonia Street commercial zone. Additional shops and stores are located on

TABLE 22

PROBABLE ANNUAL RETAIL SALES IMPACT OF FERRY SYSTEM OPERATION ON SAUSALITO AT MAXIMUM FERRY PATRONAGE LEVELS

Visitors to Sausalito For Pleasure[1]	Number of Visitors	Annual Spending Per Range of Visitor/Commuter Daily Expenditures	
		$0.50	$2.50
Retail Purchases[2]	4,305	$ 785,660	$3,928,310
Eating & Drinking	2,870	582,720	2,618,870
Total	7,175	$1,368,380	$6,547,180
Commuter Visitation[1]			
Retail Purchases[3]	220	$ 40,150	$ 200,750
Eating & Drinking	140	25,550	127,750
Total	360	$ 65,700	$ 328,500

---

[1] Average low-high daily visitation level, weekdays and weekend/holiday service levels.

[2] Primarily comparison/specialty goods.

[3] Primarily convenience goods.

Source: LeBlanc & Company

TABLE 23

VISITOR EXPENDITURE LEVELS TRANSLATED INTO SUPPORTABLE FLOOR AREA,
MAXIMUM FERRY SYSTEM PATRONAGE

	Estimated Range of Impact[1]	
Visitor Expenditures for Retail Purchases	$ 825,810	$ 4,129,060
Supportable Floor Area (Sq.ft.)	11,010	55,050
Visitor Expenditures for Food and Beverage	$ 608,270	$ 2,746,620
Supportable Floor Area (Sq.ft.)	6,082	27,470
Total Potential Floor Area Supported (Sq.ft.)	17,092	82,520

---

[1] From Table 22

Source: LeBlanc & Company

Bridgeway at the 2nd Street junction (near Richardson) and in North Sausalito near Harbor Drive. Thus, the potential pressure for additional visitor-serving commercial space will be substantial (up to 101,490 square feet, excluding underutilized capacity). It is likely that the bulk of developer interest will center on locating such space north of Central Sausalito (in new development projects) because of available lack of space in the older central zone.

It is anticipated that developer interest in this space potential would be focused first on Central Sausalito, and second on the north waterfront. The creation of this level of space would possibly generate new jobs (store and restaurant/bar employees) for 60-275 persons, primarily in the lower wage-earning brackets (clerks, service workers, and related occupations).

Pressures for office space development arising from expanded ferry service will likely not be significant. Some interest in Sausalito office locations might emerge, perhaps on the part of smaller professional firms wanting direct transit service to San Francisco. However, the probability of a massive shift of this nature is generally not believed to be high, as the ferry system does not offer the maximum "penetration" to San Francisco (as do the Civic Center and Financial District bus routes) for business activities. For a San Francisco office needing daily mobility in Marin County, use of the auto (at off-peak hours) will remain for some time a strong alternative to ferry use. Thus, the commuter-to-San Francisco function should remain for some years the major aspect to ferry operations and would not induce office locations in Sausalito.

5.6.0 POPULATION AND HOUSING

5.6.1 Population

No significant direct impact on Sausalito's resident population is expected to arise from expansion of ferry facilities or service.

Further examination of impacts upon residential character of Sausalito (such as how many visitors might relocate to Sausalito) are relevant, but presently unanswerable questions.

5.6.2 Housing

Several potential types of impact were noted in Section 5.5.0; the first was increased pressure for residential locations caused by expansion of ferry operations. Expansion of commuter capacity at Sausalito could, at some future time, be related to certain increased residential demand in Sausalito and southern Marin (as far north as Mill Valley, since ferry users living, or seeking to live, north of Corte Madera ridge would choose Larkspur Terminal as their ferry terminal). The question, then, is the "draw" of the Sausalito Terminal operations related to Sausalito residential patterns. Unfortunately, this question is considerably clouded by: (1) transportation modal questions, such as preferences for ferry, auto, and Golden Gate bus service at various fare levels and trip times, and (2) the dynamics of the housing market in Southern Marin.

Presently, after operating for almost four years, the M.V. Golden Gate carries an average of 400 commuters from Marin to San Francisco, depending on weather, time of year, and other factors. This is roughly 20 percent of capacity at peak hour commute runs (7:15 and 8:25 a.m. and 4:10 and 5:30 p.m.). Thus, the ferry is not at capacity and most Sausalito and other Marin commuters use autos and express buses to travel to and from work (it is estimated that some 15 percent of all Sausalito commuters use the ferry). It is possible, therefore, that neither existing nor expanded service from Sausalito would draw (in the foreseeable future) sufficient commuters to bring about a dramatic increase in demand for Sausalito homesites.

If one assumes dramatically increased ferry commuter patronage in the future (due to increased Golden Gate Bridge congestion, bus system scheduling, and ferry service capacity), would this alone automatically translate into pressure for residential use in Sausalito? It is possible, although housing costs in Sausalito are certain to screen out all but the affluent, smaller households, and there are still less costly housing alternatives available elsewhere in southern Marin, within easy reach of the Sausalito Ferry Terminal by feeder bus or auto.

A certain percentage of commuters might decide to actually reside in Sausalito as a result of the expanded ferry system, and this would bring about two conditions: (1) some continuing upward pressure on residential prices and rents for existing units in the vicinity; and (2) other pressures translating into increased market support for new projects in Sausalito.

The strategic location of Sausalito for all transportation alternatives (ferry, bus, or auto) makes conclusions related to the ferry terminal's residential impact strictly speculative. The residential market conditions expressed above could very well arise because of Sausalito's location, amenities, and character.

The limited employment that might be generated by ferry visitors (60-275 jobs in total) could, to a degree, stimulate residential demand in Sausalito. However, the relatively modest income of service categories will keep the bulk of these employees out of the increasingly expensive Sausalito housing market.

It has been pointed out that most of the North Sausalito development proposals include residential uses (smaller units and higher densities) that might increase the moderate-income housing stock. This is very unlikely, with housing production costs and subsequent sale prices rising at annual rates of 12-20 percent, from a base price near $50,000 per unit.

5.7.0 HISTORICAL AND ARCHAEOLOGICAL IMPACT

The construction of the terminal would not impact any existing historical feature except to the extent that the existing unused ferry dock pilings that would be removed represent an historic element of the Sausalito waterfront. This is not considered a significant impact.

No archaeological resources exist on the site, and, therefore, the project would have no impact in this area.

5.8.0 IMPACTS OF TEMPORARY TERMINAL

Construction of the new temporary ferry terminal at the project site and its relocation during construction approximately 80 feet south would have no adverse impact on the socioeconomic environment. However, this relocation would be outside the current proposed lease area for the permanent terminal, and permission to this location would have to be obtained.

6

SECTION 6.0.0
ANY ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSAL IS IMPLEMENTED

6.0.0 ANY ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSAL IS IMPLEMENTED

6.1.0 ADVERSE IMPACTS TO THE NATURAL ENVIRONMENT

Preceding sections of this report indicate that the project will have no adverse impacts on the natural environment. This is generally due to the scale and location of the project and the lack of sensitive natural environments associated with the project site.

The project does have some minimal impact on the natural environment. For a discussion of the project's impact on the natural environment, see Sections 4.0.0 through 4.6.0.

6.2.0 ADVERSE IMPACTS TO THE SOCIAL, ECONOMIC, AND MAN-MADE ENVIRONMENT

6.2.1 Marin Municipal Water District

The proposed project may have an adverse impact on Marin Municipal Water District policies. As stated earlier in Section 3.4.1, "a water shortage emergency condition prevails within the area served by this district due to a threatened water shortage" (Marin Municipal Water District, 1973). Subsequently, MMWD has legislated a moratorium on new and increased water demands (Ordinance No. 121).

This moratorium is currently being tested in the courts, but will remain in effect until such time that higher court ruling may resolve the issue.

6.2.2 Conflict of Governmental Policies

In Section 5.1.1, policies at various governmental levels are related to Bridge District plans. From a regional policy standpoint, plans for the expanded ferry service at Sausalito is supported by the view that increased ferry service between Sausalito and San Francisco will lessen dependency on the automobile in the Golden Gate Corridor and serve the regional interest.

However, from a local policy standpoint, the Sausalito City Council maintains that the project is not in the best interests of Sausalito. In short, the City feels that the potential project-induced visitor activity and traffic could negatively change Sausalito.

6.2.3 Transportation System

From a local standpoint, the proposed project would generate an adverse impact on the Sausalito transportation system. The additional passengers brought to downtown Sausalito by the ferries require more automobile and bus operations on Bridgeway on weekdays and more downtown pedestrian facilities on weekends. An increase in the number of vehicles and pedestrians would generate more traffic conflicts and congestion in the area.

On the other hand, it can be said that the proposed ferry terminal system is in itself a mitigating measure designed to reduce the adverse traffic impact resulting from an increase in transportation demand in Sausalito and the Golden Gate Corridor. The implication of not carrying out the project as an alternative to this local adverse impact is discussed in Section 8.2.0, No Project Alternative.

7

SECTION 7.0.0
MITIGATION MEASURES PROPOSED TO MINIMIZE THE IMPACT

7.0.0 MITIGATION MEASURES PROPOSED TO MINIMIZE THE IMPACT

7.1.0 MITIGATION MEASURE PROPOSED TO MINIMIZE THE IMPACT ON THE SOCIAL, ECONOMIC, AND MAN-MADE ENVIRONMENT

7.1.1 Marin Municipal Water District

As discussed in Section 6.2.1, the project's water demands may have an adverse impact on Marin Municipal Water District (MMWD) Ordinance No. 121. However, due to the political nature of the moratorium (Ordinance No. 121) and continued court litigation over the matter of the moratorium's legality, no definitive measures of mitigation have been offered in terms of the project's potential impact on MMWD. See Section 3.3.1.

7.1.2 Transportation System

To mitigate the potential adverse impact on the local (Sausalito) transportation system, the Bridge District has leased land in the North Sausalito area for purposes of parking and shuttling ferry patrons to the terminal site in downtown Sausalito. Such an operation, however, requires patrons to change transport mode at least twice in the course of their journey, thus diminishing the attractiveness of the service.

From a regional transportation analysis, the project itself is a mitigating measure designed to reduce automobile congestion in the Golden Gate Corridor.

8 SECTION 8.0.0
ALTERNATIVES TO THE PROPOSED PROJECT

8.0.0 ALTERNATIVES TO PROPOSED PROJECT

8.1.0 LOCATIONAL ALTERNATIVES

Three major locations have been proposed for the Sausalito Ferry Terminal and these will be referred to by the following names:

1. Downtown Sausalito (the site of the project which is the subject of this EIR).

2. North Sausalito (on the shoreline just north of the Army Corps of Engineers' Facility in the Marinship area).

3. Johnson Street (the east end of the pier at the foot of Johnson Street).

The latter two sites will be discussed as alternative locations to the project site. The impacts of a ferry terminal at these alternative locations are evaluated without doing complete environmental impact reports for each of these locations. Therefore, the alternative location impacts are based on available data. Comparisons of the impacts will be made between all three proposed terminal locations.

8.1.1 Downtown Sausalito

The Downtown site exposes a lesser amount of the shoreline to noise than the alternative sites, although the Downtown site is closest to concentrations of people and residences. However, the northerly two sites would result in noise exposure to many residents of houseboats and boats in close proximity to the ship channels.

The Downtown Terminal project would result in much less boating conflicts than the alternative terminal sites. Ferries operating in the Sausalito shipping channel would add to the boat traffic congestion there, especially during peak periods which occur on weekends and holidays. Also, ferry-generated waves would be detrimental to the multitude of boats and houseboats docked along the channel as well as to small boats operating in the vicinity. Therefore, ferries operating in the channel would have to slow their speeds, thus lengthening trip times. Consequently, the alternative terminal sites would have less advantageous trip times than the Downtown site.

Due to its close proximity, the Downtown site is the most advantageous for visitors to Sausalito's Central Business District.

The development of Sausalito's ferry terminal at either alternative site could be detrimental to the CBD. A terminal at one of the alternative sites could generate adjacent commercial development that could drain off sales from Downtown Sausalito.

8.1.2 North Sausalito

A ferryboat route to the North Sausalito terminal site would require a significant amount of initial and maintenance dredging to widen the Sausalito shipping channel on its eastern edge. The widening would be necessary because of the high volume of boat traffic in the narrow channel. Possible adverse impacts of this dredging as well as its high costs may preclude a ferry terminal from the North Sausalito area.

The terminal site area is partially occupied by private yacht harbors and boat maintenance facilities, while portions of future parking lots are occupied by light industrial and commercial uses. The impact of the terminal displacing these facilities is somewhat mitigated by the state of disrepair of many of these facilities. The amount and cost of demolition required exceeds that of the other terminal locations.

The North Sausalito alternative is most advantageous of the three sites with respect to vehicular access. At this location, Bridgeway is four lanes wide, and development of an efficient mode-transfer facility would be possible. To connect the terminal to Bridgeway, improvements would be necessary to Gate 5 Road, Marinship Way, Harbor Drive, and the proposed Terminal Street. Passengers going to and from Downtown Sausalito would have a longer trip with this terminal site; consequently, Golden Gate Transit already conveying passengers from the parking facilities here to downtown would have to continue to do so. The level of service required on weekdays would be less than that required for the Downtown Terminal site, but bus service on weekends to Downtown Sausalito would have to be expanded to meet the demand. An alternative to this bus service is for the ferryboats to make a stop at the Downtown site on the way to North Sausalito. However, this stop would considerably lengthen travel times between North Sausalito and San Francisco.

Motor vehicle parking availability in North Sausalito is far better than either of the other terminal sites. There is an existing parking lot for ferry passengers, and land could be acquired for more parking lots.

Overall monetary costs of the North Sausalito alternative would exceed that of the Downtown Sausalito site.

8.1.3 Johnson Street

A ferry terminal at the end of Johnson Street is probably less advantageous than either the Downtown or North Sausalito sites. The Johnson Street site has less motor vehicle parking than either site and would serve neither the downtown nor the ferry passenger parking lots in Marinship. Ferry passengers desiring to go to Downtown Sausalito would have a long walk to finish their trips. The addition of these pedestrians in this

corridor will make the provision of more walkways necessary. The amount of walkways required for this alternative would be greater than either of the other terminal sites.

An advantage the Johnson Street site has over the Downtown site is bus and auto access. At the Johnson Street site, buses and autos carrying ferry passengers to and from the north would not have to enter the often congested downtown area.

A Johnson Street ferry terminal would cause the displacement of several boats and houseboats along with their docking spaces. Some of these houseboats and boats are permanent homes whose residents would be displaced as well. Replacement docking space would have to be found in Sausalito, where long waiting lists for such space exist at every marina. The supply of berthing spaces in the vicinity will soon be increased, pending City approval of two privately sponsored yacht harbor expansion proposals. The Sausalito Yacht Harbor is proposed to be expanded by 250 berths on the underwater blocks bounded by Johnson Street, Donahue Street, Ensign Avenue, and Railroad Avenue. South and adjacent to this block is the Pelican Harbour expansion proposal of 100 berths. The Sausalito Yacht Harbor proposal would conflict with a ferry terminal, but both projects could be modified to enable their compatibility with one another.

As with the North Sausalito site, but to a lesser extent, the Johnson Street location would require initial and maintenance dredging to widen the channel. This dredging would be expensive and possibly environmentally harmful.

Total monetary costs of the Johnson Street alternative would exceed that of the Downtown site.

In summary, there would be more adverse impact to the natural and man-made environment in locating the ferry terminal at the alternative sites, rather than at the project site. Reinforcing this viewpoint is the City of Sausalito Planning Commission which recommended to the City Council on April 18, 1973 that the Downtown Sausalito site be the location for the Bridge District's proposed expansion of ferry service. The Commission made this recommendation after reviewing alternative sites.

8.1.4 Review of Relevant Reports

Several reports have investigated Marin County ferry terminal sites for Marin/San Francisco routes:

a. Philip F. Spaulding and Associates Golden Gate Commuter Ferryboat System (1970) recommended three Marin County terminal locations:

1. Downtown Sausalito (at the existing terminal site).

2. Corte Madera Creek, in either the City of Corte Madera or the City of Larkspur.

3. Gallinas Creek at the mouth of the creek, in Novato.

The report compared the Downtown Sausalito with the North Sausalito site and concluded that the Downtown site was the more desirable of the two. The report also studied the possibility of connecting Tiburon to the new system ferries.

b. Kaiser Engineers' Draft EIR on the Proposed Expansion of Ferry Services Between San Francisco and Marin County (1971) evaluated ferry terminals at:

   1. Downtown Sausalito just north of the Sausalito Yacht Club.

   2. North Sausalito.

   3. Larkspur on Corte Madera Creek east of the U.S. 101 Sir Francis Drake Boulevard intersection.

   The EIR did not recommend any one of these sites over the others.

c. Environmental Planning and Design Associates' Design Report on Sausalito Ferry Terminal Master Plan (1972) and Cost Estimates on Sausalito Ferry Terminal Master Plan (1972) both recommended that the Sausalito Ferry Terminal be located at the present Golden Gate Ferry Terminal site in Downtown Sausalito, rather than the North Sausalito location. The report evaluated a downtown terminal that included modifications to City Parking Lot 1 and Vina Del Mar Park. These modifications are no longer part of present plans; thus, the report's cost estimates are not applicable to present plans. However, it should be noted that the north Sausalito terminal site would require substantially greater costs due to dredging, demolition, and street improvements whereas, under present plans, the Downtown Sausalito terminal will not require these costs. It is possible, however, that the increased patronage at the downtown facility may justify future improvements for traffic circulation and parking nearby. The costs of these improvements have not been included in the comparison.

8.2.0 "NO PROJECT" ALTERNATIVE

The "no project" alternative would have the impact of lessening available alternatives to automobile transportation in the Golden Gate Corridor and Sausalito.

The "no project" alternative would also eliminate certain adverse environmental impacts discussed in Sections 4.0.0, 5.0.0, and 6.0.0, including:

1. Some contribution to local air pollution (4.1.0), although regional air pollution would be reduced by the project.
2. Some potential for disturbing benthic organisms if dredging is required (4.2.0).
3. Potential for seismic-induced hazards damaging the terminal facility (4.3.0).
4. Some increase in noise levels during construction and operation (4.6.0).
5. Conflicts with Marin Municipal Water District water service policies (6.2.1).
6. Conflict between Bridge District and City of Sausalito policies (6.2.2).
7. Impacts on local transportation facilities in Sausalito--increasing pedestrian and vehicular traffic (6.2.3).

From a regional perspective, the "no project" alternative would also mean a loss in terms of Federal financial support (The U.S. Department of Transportation's Urban Mass Transportation Administration will finance 66-2/3 to 80 percent of the cost of the proposed ferry terminal if the terminal meets UMTA approval).

The implication of the financial loss is that (in view of heavy public dependency on the automobile and its associated negative impacts) a critically needed alternative mode of transportation (the expanded ferry service between San Francisco and Sausalito) in the heavily traveled Golden Gate Corridor would most probably be lost, since the Bridge District would probably not finance the new terminal on its own.

However, from a local perspective, the "no project" alternative would support the present policies and goals as promulgated by the City of Sausalito to maintain the present level of ferry service. Section 6.2.2 discusses these impacts.

8.3.0 DESIGN ALTERNATIVES

There have been two other basic Master Design Plans proposed for the downtown Sausalito terminal site. In 1971, the Bridge District retained Environmental Planning and Design Associates of Sausalito to develop a "Design Report" which would evaluate alternative Master Plans for various ferry terminal sites in Sausalito. The report, completed in August, 1972, discusses two different master plans for the downtown terminal site. Both Master Plans required substantial changes in the land mass and relocation of an adjacent structure. Recently, due to political and economic considerations, these alternatives have been rejected for a more austere Master Plan which would not require relocation of adjacent structures.

9

SECTION 9.0.0

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

9.0.0 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

In discussion of the project's relationship between short-term uses versus long-term productivity, it must be understood that the project itself can be considered a mitigating measure, developed by the Bridge District to relieve automobile congestion in the Golden Gate Corridor. Therefore, the proposed project is in effect serving as a regional measure to mitigate the potential long-term impacts associated with continued dependency upon the automobile.

In light of this perspective, it appears that the project exhibits no regional long-term adverse impacts. However, from a local standpoint, the project will generate certain short-term adverse impacts. These areas have been identified in Section 6.2.0. Briefly, these three areas are: (1) the project's potential adverse impact on the policies of the Marin Municipal Water District; (2) the project's adverse impact on City of Sausalito current policies; and (3) the project's adverse impact on the local (City of Sausalito) transportation systems. Sections 6.2.1, 6.2.2, and 6.2.3 address these issues.

10

SECTION 10.0.0

ANY IRREVERSIBLE ENVIRONMENTAL CHANGES WHICH WOULD BE INVOLVED IN THE PROPOSED PROJECT SHOULD IT BE IMPLEMENTED

10.0.0 ANY IRREVERSIBLE ENVIRONMENTAL CHANGES WHICH WOULD BE INVOLVED IN THE PROPOSED PROJECT SHOULD IT BE IMPLEMENTED

There are believed to be no specific irreversible environmental changes associated with the project should it be implemented.

However, the project will generate certain environmental changes, but these are judged to be reversible. These changes are associated with the site's biotic environment and commitment of construction resources (lumber, concrete, etc.). The site's biota (see Section 4.2.0) is judged to be sufficiently regenerative to overcome environmental disturbance associated with construction operations.

The project's construction resources committed are renewable on a long-time basis and certainly, removal and reuse of these resources is within long-term use option of Sausalito's waterfront. This is true generally due to the nature of the project. Projects, such as a shopping center or industrial park, require large amounts of resources, making long-term removal highly unlikely.

Additionally, the project in tandem with other factors (development pressures in Sausalito, Sausalito's attractions, etc.) will have a secondary impact on the local (Sausalito) transportation systems. However, as discussed in Section 5.5.0, the project's transportation impact on Sausalito is paridoxical (assuming that regardless of the proposed project, Sausalito will continue to be a major attraction) because the project could relieve (due to the potential diversion from automobile to ferry) weekend and holiday automobile congestion in Sausalito and, on the other hand, potentially increase traffic congestion in Sausalito on weekdays, due to influx of commuters using the Sausalito ferry as means of transportation to work). The Larkspur Ferry Terminal, however, would accommodate more of the total ferry commuter patronage than Sausalito.

Due to the nature of this project, there are judged to be no areas of project development in which there is a potential for environmental accidents.

11 SECTION 11.0.0
GROWTH-INDUCING IMPACTS

11.0.0 GROWTH INDUCING IMPACT

Additional "growth" or new real estate development in Sausalito will not be purely a function of ferry system facilities and operations. The expanded ferry service made possible with the new Spaulding S-165's could produce measurable pressure for expansion of Sausalito's retail commercial activities--and floor area. The actual dimensions of this development pressure are to a great extent dependent upon these variables:

> The actual patronage experienced on the ferries each period (it could, for example, be far less than "maximum capacity" even in the summer months).
>
> The diversion from other travel modes brought about by ferry system expansion (i.e., what percentage of total ferry trips are replacing auto and bus trips). Since twenty-three percent of Sunday vehicular traffic is bound for Sausalito, according to the Bridge District and Marin County Planning Department, any diversion would have some effect at this peak time.
>
> The ability of existing Sausalito retail and service outlets to increase sales performance (unknown) and thus absorb new purchasing power.
>
> The actual outlays for goods and services by larger ferry patronage (yet to be tested).

Further, other pressures for development exist in Sausalito over and beyond the impact of visitors to the area. Waterfront and other property owners seek "highest use" of their holdings. With southern Marin in the grip of an "anti-growth" movement, some investors will view reuse of Sausalito properties as an alternative, but Sausalito could control these uses.

A final point is that ferry service generated development pressures in Marin County in general would also be affected by the Larkspur Ferry Terminal, since commercial development is planned adjacent to this terminal area.

Thus, expansion of the Sausalito Ferry Terminal, and provision of additional ferry capacity will not, in all likelihood, lead the pressures upon Sausalito's economy. Full utilization of an expanded system, however, if it occurs, will add (to some degree) to a reinforcing of Sausalito as a visitor destination area.

12 SECTION 12.0.0
SOURCES AND REFERENCES

12.0.0 SOURCES AND REFERENCES

12.1.0 INDIVIDUALS CONTACTED

William Angeloni, U.S. Army Corps of Engineers Facility - Sausalito.

Herb Case, Planning Director, City of Sausalito.

Jerry Cormack, Assistant Planner, City of Sausalito.

Stanley M. Kowleski, Ferry Transit Manager, Golden Gate Bridge, Highway and Transportation District.

Roland Mays, Environmental Planning and Design Associates, Sausalito.

Dan E. Mohn, Project Engineer, Golden Gate Bridge, Highway and Transportation District.

Ronald R. Musser, Environmental Planning and Design Associates.

John Peckham, Associate Engineer, Marin Municipal Water District.

Harry D. Reilich, District Engineer, Golden Gate Bridge, Highway and Transportation District.

Gene P. Rexrode, Project Engineer, Golden Gate Bridge, Highway and Transportation District.

Eric Robinson, Chief, Ferry Operations, Golden Gate Bridge, Highway and Transportation District.

Norman Wohlschlaeger, Public Works Director/City Engineer, City of Sausalito, Department of Public Works.

Ensign Lamar Wright, 12th Coast Guard District, U.S. Coast Guard.

Clerin W. Zumwalt, Manager, Land Management Division, Marin Municipal Water District.

12.2.0 BIBLIOGRAPHY

Arthur D. Little, Inc. Feasibility Study of San Francisco - Marin Ferry System. San Francisco: Arthur D. Little, Inc., July, 1969.

Association of Bay Area Governments. Regional Plan 1970:1990 San Francisco Bay Region. Berkeley: ABAG, June,1970.

California Regional Water Quality Control Board, San Francisco Bay Region. Interim Water Quality Control Plan for the San Francisco Bay Basin. Oakland: California Regional Water Quality Control Board, June, 1971.

California State Board of Equalization. Statistical Research and Consulting Division. Sacramento: Board of Equalization, 1973.

California State Department of Finance. Population Estimates for California Counties. Sacramento: Department of Finance, 1973.

_________. "Population Projections." Sacramento: Department of Finance, December 1969.

California State Department of Human Resources Development. Area Manpower Review, San Francisco - Oakland Metropolitan Statistical Area. San Francisco: HRD, April 1973.

California State Office of the Secretary for Resources. Guidelines for Implementation of the California Environmental Quality Act of 1973 As Amended December 17, 1973. Sacramento: Secretary for Resources, December 17, 1973.

CH_2M-Hill. Water Resources Management Study for Marin Municipal Water District, Phase II, Memorandum. San Francisco: CH_2M-Hill, 1973.

Environmental Impact Planning Corporation. Environmental Impact Report Schoonmaker Project, Sausalito, California. Sausalito: City of Sausalito, February 8, 1974.

Environmental Planning and Design Associates, Sausalito, California. Cost Estimates on Sausalito Ferry Terminal Master Plan. San Francisco: Golden Gate Bridge, Highway and Transportation District, August, 1972a.

Environmental Planning and Design Associates, Sausalito, California. Design Report on Sausalito Ferry Terminal Master Plan. San Francisco: Golden Gate Bridge, Highway and Transportation District, August, 1972b.

Federal Highway Administration. Capacity Analysis Techniques for Design of Signalized Intersections. Washington, D.C.: Federal Highway Administration, 1971.

General Motors Corporation. Method of Estimating and Graphically Comparing the Amounts of Air Emissions. Warren, Michigan: G.M.C., January 1972.

Golden Gate Bridge, Highway and Transportation District. "Commuter Bus and Ferry Interface; Sausalito Survey, Interoffice Memorandum." San Francisco: G.G.B.H.T.D., October 24, 1972a.

Golden Gate Bridge, Highway and Transportation District. Environmental Impact Report Larkspur Ferry Terminal. San Francisco: Golden Gate Bridge, Highway and Transportation District, November, 1973a.

________. Golden Gate Corridor Transportation Facilities Plan. San Francisco: Golden Gate Bridge District, April, 1971.

________. Monthly Statistical Summary. San Francisco: G.G.B.H.T.D., 1973b and 1974.

________. "Passenger Survey - M.V. Golden Gate, October 24, 1972." San Francisco: G.G.B.H.T.D., 1972b.

Kaiser Engineers. Draft Environmental Impact Statement on the Proposed Expansion of Ferry Services Between San Francisco and Marin County for the Golden Gate Bridge, Highway and Transportation District. San Francisco: Golden Gate Bridge, Highway and Transportation District, November, 1971.

Marin County. The Marin Countywide Plan. San Rafael: County of Marin, June, 1973.

Marin Municipal Water District. Ordinance No. 121 - Prohibitions and Restrictions on New Water Service Connections. Corte Madera: MMWD, June 7, 1973.

Metropolitan Transportation Commission. Regional Transportation Plan. Berkeley: MTC, June 1973.

National Academy of Sciences, Highway Research Board. Highway Capacity Manual, 1965. Washington, D.C.: Highway Research Board, 1965.

Philip F. Spaulding and Associates. Golden Gate Commuter Ferryboat System San Francisco-Marin Crossing. San Francisco: Golden Gate Bridge Highway and Transportation District, August, 1970.

San Francisco Bay Conservation and Development Commission. San Francisco Bay Plan. San Francisco: BCDC, January, 1969.

Santa Clara County. INFO Number 405 - Population 1950, 1960, 1966, and 1970, California and San Francisco Bay Area Counties. San Jose: County of Santa Clara, 1971.

________. INFO Number 458 - Estimated Average Annual Employment by Industry, and Total Unemployment Nine County San Francisco Bay Area, 1957 - 1971. San Jose: County of Santa Clara, 1972.

Sausalito City Department of Public Works. Sausalito Traffic Survey March, 1972. Sausalito: City of Sausalito, 1972.

Sausalito, City of. General Plan for Sausalito. Sausalito: City of Sausalito, December, 1970.

Sausalito, City of. Open Space and Conservation Elements. Sausalito: City of Sausalito, 1974.

________. Sausalito Municipal Code, Title 10, Zoning Regulations. Sausalito: City of Sausalito, January, 1964 as amended.

Scenic Railways, Inc. Environmental Impact Report for the Sausalito - Richardson Bay Railroad. Sausalito: City of Sausalito, April, 1973.

Security Pacific National Bank. Monthly Report of Building Permit Activities in the Cities and Counties of California. San Francisco: SPNB, 1971, 1972, and 1973.

U.S. Department of Commerce, Bureau of the Census. 1970 Census of Population and Housing. Washington, D.C.: Bureau of the Census, 1972.

William Spangle and Associates and Eckbo, Dean, Austin, and Williams. Park Plaza Area Plan a guide to action for the City of Sausalito. Sausalito: City of Sausalito, September, 1970.

13 SECTION 13.0.0
APPENDICES

APPENDIX A

TABLES & EXHIBITS

TABLE A-1

TIDAL DATA
SAUSALITO

Land Elevation: + 13.5' from Mean Lowest Low Water (MLLW)

Tidal Phase	Heights[1/]
Extremely High (EH)	+8.5
Mean Highest High Water (MHHW)	5.6
Mean High Water (MHW)	5.0
Mean Tide (MT)	3.1
Mean Low Water (MLW)	1.1
Extremely Low (EL)	-2.5

1/ Interpolation of United States Coast and Geodetic Survey data (in feet).

Source: Environmental Planning and Design Associates.

TABLE A-2

ESTIMATED AVERAGE ANNUAL EMPLOYMENT AND PERCENTAGE DISTRIBUTION BY INDUSTRY NINE-COUNTY SAN FRANCISCO BAY AREA 1960, 1966, 1970, 1971

	Number of Employees in 1,000's (00.0) = Percent of Total Employment			
	1960	1966	1970	1971
Total Civilian Employment	1,427 (100.0)	1,753 (100.0)	1,968 (100.0)	1,943 (100.0)
Agriculture	36 (2.5)	29 (1.7)	26 (1.3)	26 (1.3)
Manufacturing - Durable Goods	151 (10.6)	192 (10.9)	207 (10.5)	192 (9.9)
Manufacturing - Nondurables	125 (8.8)	129 (7.4)	132 (6.7)	127 (6.6)
Mining	2 (0.2)	2 (0.1)	2 (0.1)	2 (0.1)
Construction	78 (5.5)	86 (4.9)	84 (4.3)	81 (4.2)
Trans., Comm. & Utl.	117 (5.5)	136 (4.9)	157 (4.3)	151 (7.8)
Trade	262 (18.3)	317 (18.1)	361 (18.4)	362 (18.6)
Finan., Ins. & Real Est.	77 (5.4)	94 (5.4)	115 (5.8)	115 (5.9)
Services	178 (12.5)	259 (14.8)	318 (16.2)	317 (16.3)
Government	239 (16.8)	325 (18.5)	376 (19.1)	379 (19.5)
Other Nonagricultural	162 (11.4)	184 (10.5)	190 (9.7)	191 (9.8)

Source: Santa Clara County, INFO Number 458 - Estimated Average Annual Employment by Industry, and Total Unemployment Nine County San Francisco Bay Area, 1957-1971 (San Jose; County of Santa Clara, 1972)

TABLE A-3

PERCENT OF NINE-COUNTY SAN FRANCISCO BAY AREA EMPLOYMENT IN MARIN COUNTY BY INDUSTRY
1960 AND 1970

	1960	1970
Total Civilian Employment	2.3	2.8
Agriculture	3.1	4.2
Manufacturing - Durable Goods	.9	1.1
Manufacturing - Nondurables	.7	.8
Mining	5.0	5.0
Construction	4.2	3.1
Trans., Comm., & Utl.	1.3	1.5
Trade	2.4	3.2
Finan., Ins. & Real Est.	1.6	1.7
Services	2.1	3.8
Government	2.9	3.4
Industry Not Reported	4.1	3.6

Source: Wilsey & Ham derivation of Table A-2 and A-4.

TABLE A-4

ESTIMATED AVERAGE ANNUAL EMPLOYMENT BY INDUSTRY
MARIN COUNTY
1960 AND 1970

	Number & Employees (1,000's)	
	1960	1970
Total Civilian Employment	32.9	54.7
Agriculture	1.1	1.1
Manufacturing - Durable Goods	1.4	2.3
Manufacturing - Nondurables	.9	1.0
Mining	.1	.1
Construction	3.3	2.6
Trans., Comm. & Utl.	1.5	2.4
Trade	6.2	11.4
Finan., Ins. & Real Est.	1.2	2.0
Services	3.7	12.2
Government	6.9	12.7
Industry Not Reported	6.6	6.9

Source: California State Employment Development Department, Area Manpower Review, San Francisco-Oakland SMSA (San Francisco: EDD, April, 1973), p.54.

TABLE A-5

ESTIMATED AVERAGE ANNUAL EMPLOYMENT AND UNEMPLOYMENT
SAN FRANCISCO-OAKLAND METROPOLITAN AREA
1963-1972

Year	Average Annual Employment (in 1000's)	Unemployment (in 1000's)	Average Annual Unemp. as Percent of Civilian Labor Force
1963	1,158.1	65.4	5.3%
1964	1,189.3	66.7	5.3
1965	1,224.7	64.9	5.0
1966	1,274.3	58.7	4.4
1967	1,310.3	60.6	4.4
1968	1,356.8	56.4	4.0
1969	1,400.7	57.1	3.9
1970	1,396.9	74.6	5.1
1971	1,375.2	86.6	5.9
1972	1,396.3	81.2	5.5

Source: California State Employment Development Department, Area Manpower Review, San Francisco-Oakland Metropolitan Statistical Area (San Francisco EDD, April, 1973).

TABLE A-6

DEFINITIONS

The "Universe of Need" figures reflect the total number of individuals 16 years of age or over with employment-related problems. Definitions of some of the terms used for the component classifications follow.

POOR: Members of families whose annual income does not exceed the Federal determination of poverty. Changes in consumer prices are taken into account to compute the poverty level each year. In 1971, the poverty level was $4,137 for a nonfarm family of four.

NEAR POVERTY: Members of families whose annual income is no more than one-third above the poverty level.

ALL OTHER NONPOOR: Members of families whose annual income is above the near poverty threshold but who are underutilized (see below) or are expected to be unemployed (see below) at some time during the planning year.

DISADVANTAGED: Poor individuals who are a) school dropouts, b) non-white or Spanish-American, c) less than 22 years of age, d) over 45 years of age, e) handicapped, or f) parolees or prison releasees.

UNEMPLOYED: Individuals without jobs who are available for and actively seeking work.

UNDERUTILIZED: Persons who are a) employed part-time but want full-time work, b) employed full-time but with family income below poverty level, or c) not in the labor force but would be if they believed work were available.

EMPLOYED PART-TIME: Persons who work less than 35 hours a week because they are unable to find full-time work.

NOT IN LABOR FORCE BUT SHOULD BE: Individuals without jobs, who are not seeking work because they don't believe it is available.

Source: California State Employment Development Department, Area Manpower Review, San Francisco-Oakland SMSA (San Francisco: EDD, April, 1973), p. 55.

TABLE A-7

ESTIMATED UNEMPLOYMENT AND UNDERUTILIZED, DISADVANTAGED
SAN FRANCISCO-OAKLAND METROPOLITAN AREA
FISCAL YEAR 1973-1974

Unemployed Disadvantaged	13,900
Underutilized Disadvantaged	71,100
Employed Part-Time	14,500
Employed Full-Time but with family income at or below poverty level	7,900
Not in Labor Force but Should Be	48,700

Source: California State Employment Development Department, Area Manpower Review San Francisco-Oakland SMSA (San Francisco: EDD, April, 1973).

TABLE A-8

BASIC/NONBASIC EMPLOYMENT
MARIN COUNTY
1960 AND 1970

	(1000's) 1960	1970
BASIC (EXPORT) EMPLOYMENT		
Agriculture	1.1	1.1
Mineral Extraction	.1	.1
Manufacturing	2.3	3.3
Federal & State Gov't.	3.4	6.3
Total	6.9	10.8
NONBASIC (LOCAL MARKET) EMPLOYMENT		
Construction	3.3	2.6
Trans., Comm. & Utl.	1.5	2.4
Trade	6.2	11.4
Finan., Ins. & Real Est.	1.2	2.0
Services	3.7	12.2
Local Government	3.5	6.4
Industry Not Reported	6.6	6.9
Total	26.0	43.9
RATIO OF BASIC TO NONBASIC EMPLOYMENT		
Basic Employment	6.9	10.8
Nonbasic Employment	26.0	43.9
BASIC : NONBASIC RATIO	1:3.8	1:4.1

Source: California State Employment Development Department, Area Manpower Review, San Francisco-Oakland SMSA. (Sacramento: EDD, April, 1973), p. 74-5.

TABLE A-9

INCOME OF FAMILIES AND UNRELATED INDIVIDUALS
MARIN COUNTY
1969

Income	Distribution*
Under $1,000	857
$ 1,000 - 1,999	582
2,000 - 2,999	1,003
3,000 - 3,999	1,127
4,000 - 4,999	1,432
5,000 - 5,999	1,630
6,000 - 6,999	1,619
7,000 - 7,999	2,052
8,000 - 8,999	2,362
9,000 - 9,999	2,272
10,000 - 11,999	5,499
12,000 - 14,999	8,561
15,000 - 24,999	15,788
25,000 - 49,999	6,060
50,000 or more	1,068

Median Income: $13,935

---

*Based on 51,912 families (20 percent sample).

Source: U. S. Bureau of the Census, 1970 Census of Population (Washington, D. C.: Bureau of the Census, 1972).

TABLE A-10

INCOME OF FAMILIES AND UNRELATED INDIVIDUALS
CITY OF SAUSALITO
1969

Income	Distribution*
Under $1,000	50
$ 1,000 - 1,999	15
2,000 - 2,999	41
3,000 - 3,999	33
4,000 - 4,999	20
5,000 - 5,999	33
6,000 - 6,999	29
7,000 - 7,999	56
8,000 - 8,999	53
9,000 - 9,999	36
10,000 - 11,999	129
12,000 - 14,999	179
15,000 - 24,999	431
25,000 - 49,999	207
50,000 or more	65

Median Income: $15,336

---

*Based on 1,377 families (20 percent sample).

Source: U. S. Bureau of the Census, 1970 Census of Population (Washington, D. C.: Bureau of the Census, 1972).

TABLE A-12

POPULATION OF CITIES IN
MARIN COUNTY
1960 AND 1970

CITY	Population 1960	Population 1970	% Change 1960-1970
Total County	146,820	209,496*	42.7
Belvedere	2,148	2,599	21.0
Corte Madera	5,962	9,645*	61.8
Fairfax	5,813	7,661	31.8
Larkspur	5,710	10,719*	87.7
Mill Valley	10,411	12,942	24.3
Novato	17,881	31,006	73.4
Ross	2,551	2,742	7.5
San Anselmo	11,584	13,031	12.5
San Rafael	20,460	38,977	90.5
Sausalito	5,331	6,158	15.5
Tiburon	N.A.	6,209	N.A.
Unincorporated	58,969	67,807*	15.0

N.A.: Not applicable; Novato incorporated in January, 1960 and Tiburon incorporated in June, 1964.

*Source: Marin County, "Comparative Population Growth 1950-1970 Marin Cities and County, Bay Area, California, United States" (San Rafael: County of Marin, 1973).

Source: U.S. Bureau of the Census, 1970 Census of Population (Washington, D. C. : Bureau of the Csnsus, 1972)

TABLE A-11

POPULATION - CALIFORNIA AND SAN FRANCISCO BAY AREA COUNTIES - 1960, 1966 AND 1970

	April 1, 1960[a/]		July 1, 1966[b/]		April 1, 1970[a/]	
	Total Population	Percent of Bay Area	Total Population	Percent of Bay Area	Total Population	Percent of Bay Area
California	15,717,133	---	18,879,000	---	19,953,134	---
Bay Area	3,638,939	100.0	4,331,100	100.0	4,630,073	100.0
County						
Alameda	908,209	25.0	1,024,800	23.7	1,073,184	23.2
San Francisco	740,316	20.3	718,400	16.6	715,674	15.5
Santa Clara	642,315	17.7	926,400	21.4	1,064,714	23.0
San Mateo	444,387	12.2	520,200	12.0	556,234	12.0
Contra Costa	409,030	11.2	520,400	12.0	558,389	12.1
Sonoma	147,375	4.1	187,100	4.3	204,885	4.4
Marin	146,820	4.0	190,600	4.4	206,038	4.5
Solano	134,597	3.7	167,900	3.9	171,815	3.7
Napa	65,890	1.8	75,300	1.7	79,140	1.7

[a/] U.S. Bureau of the Census, U.S. Census of Population (Washington, D.C.: Bureau of the Census, 1971-2).

[b/] California State Department of Finance, "Population Projections" (Sacramento: Department of Finance, December 1969).

Source: Santa Clara County, INFO Number 405 - Population 1950, 1960, 1966, and 1970, California and San Francisco Bay Area Counties (San Jose; County of Santa Clara, 1971)

TABLE A-14

ESTIMATED POPULATION AND PERCENT INCREASE OVER PRECEDING YEAR
MARIN COUNTY
JULY 1, 1963-1972

Year	Population July of Each Year (1,000's)	Interval	Total Increase	Percent Increase
1963	170.3			
1964	177.7	1963-1964	7.4	5.3
1965	185.7	1964-1965	8.0	4.5
1966	191.9	1965-1966	6.2	4.5
1967	196.8	1966-1967	4.9	3.3
1968	202.7	1967-1968	5.9	2.6
1969	204.6	1968-1969	1.9	3.0
1970	207.5	1969-1970	2.9	0.9
1971	208.4	1970-1971	0.9	1.4
1972	208.5	1971-1972	0.1	0.4

Source: California State Department of Finance, "Population Estimates for California Counties" (Sacramento: Department of Finance, December, 1969).

TABLE A-13

POPULATION BY AGE AND SEX
MARIN COUNTY
1970

Age	Total Number of Persons	Total % of Total	Male Number of Persons	Male % of Total	Female Number of Persons	Female % of Total
Total	206,038	100.00	102,530	100.00	103,508	100.00
0- 4	15,497	7.52	7,885	7.69	7,612	7.36
5- 9	19,587	9.50	10,041	9.79	9,546	9.22
10-14	20,045	9.73	10,288	10.04	9,757	9.43
15-19	16,825	8.16	8,496	8.29	8,329	8.05
20-24	15,039	7.30	7,364	7.18	7,675	7.41
25-34	31,792	15.43	16,275	15.87	15,517	14.99
35-44	28,757	13.96	14,722	14.36	14,035	13.56
45-54	26,326	12.78	13,091	12.77	13,235	12.79
55-59	9,613	4.67	4,743	4.63	4,870	4.70
60-64	7,373	3.58	3,624	3.53	3,749	3.62
65-74	9,210	4.47	3,927	3.83	5,283	5.10
75+	5,974	2.90	2,074	2.02	3,900	3.77

Source: U. S. Bureau of the Census, 1970 Census of Population (Washington, D.C., Bureau of the Census, 1971).

TABLE A-16

NEW DWELLING UNITS BY TYPE OF STRUCTURE
MARIN COUNTY
1962-1972

A. Number of Units

Year	Total	Single Family	Multifamily
1962	3,805	1,766	2,039
1963	4,603	2,175	2,429
1964	2,999	1,933	1,066
1965	2,158	1,635	523
1966	1,603	935	668
1967	1,102	800	302
1968	1,497	1,000	497
1969	1,632	933	699
1970	1,304	834	470
1971	2,909	1,644	1,265
1972	3,622	1,371	2,251
1973	3,471	1,235	2,236

B. Percent Distribution

Year	Total	Single Family	Multifamily
1962	100.0	46.4	53.6
1963	100.0	47.3	52.7
1964	100.0	64.5	35.5
1965	100.0	75.8	24.2
1966	100.0	58.3	41.7
1967	100.0	72.6	27.4
1968	100.0	66.8	33.2
1969	100.0	57.2	42.8
1970	100.0	64.0	36.0
1971	100.0	56.5	43.5
1972	100.0	37.9	62.1
1973	100.0	35.6	64.4

Source: Security Pacific National Bank, Monthly Report of Building Permit Activity in the Cities and Counties of California (San Francisco: SPNB, 1973).

TABLE A-15

HOUSING CHARACTERISTICS
MARIN COUNTY
APRIL, 1970

A. Housing Units by Structure Type

Total Housing Units	Number of Housing Units by Structure Type			Vacant & Seasonal or Migratory
	Number of Units In Structure		Mobile Homes and Trailers	
	1	2+		
71,241	51,801	18,397	504	539
%100.0	72.7	25.8	.7	.8

B. Housing Units by Type of Tenure

Total Housing Units	Occupied				Vacant				
	Total	Own	Rent	% Owner Occupied	Total	For Sale	For Rent	Other	% Vacant
71,241	67,606	41,154	26,452	60.9	3,096	440	1,131	1,525	4.3

C. Distribution of Housing Units by Value Class

a. Distribution of Owner Occupied Housing Units by Value Class

	Value of House (Owner Occupied)								
Total	$ 0-4,999	$5,000-9,999	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-34,999	$35,000-49,999	$50,000-@ over	Median Value
38,444	50	132	612	2,069	5,139	12,667	10,758	7,017	$33,900
%100.0	.1	.3	1.6	5.4	13.4	32.9	28.0	18.3	

b. Distribution of Renter Occupied Housing Units by Rental Category

	Contract Rent (Renter Occupied)								
Total	$ 0-39	$ 40-59	$ 60-79	$ 80-99	$ 100-149	$ 150-199	$ 200-or more	No Cash Rent	Median Rent
26,003	367	487	1,096	1,438	7,223	7,291	6,451	1,650	$161
%100.0	1.4	1.9	4.2	5.5	27.8	28.0	24.8	6.3	

Source: U.S. Bureau of the Census. 1970 Census of Housing, Detailed Housing Characteristics (Washington, D. C.: Bureau of the Census, April 1972).

TABLE A-17

NEW DWELLING UNITS AND PERMIT VALUATION
CITY OF SAUSALITO
1971, 1972, 1973

Year	Single-family Units	Total Value of Multi-family Units	Multi-family Units	Total Value of Multi-family Units	Total	
					Units	Value
1971	14	$ 471,000	32	$1,060,000	46	$1,531,000
1972	21	798,000	44	1,022,000	65	1,820,000
1973	15	552,000	75	1,727,000	90	2,279,000
TOTAL	50	$1,821,000	151	$3,809,000	201	$5,630,000

Source: Security Pacific National Bank, *Monthly Report of Building Permit Activity in the Cities and Counties of California* (San Francisco: SPNB, 1973).

EXHIBIT 1

JUN [illegible]
GEO. H. [illegible]
COUNTY CLERK
By R. LLOYD

GOLDEN GATE BRIDGE, HIGHWAY AND TRANSPORTATION DISTRICT
Box 9000, Presidio Station
San Francisco, California 94129

NEGATIVE DECLARATION

1. Description of Project: Minor modification of existing ferry landing facility located in the City of Sausalito, consisting of replacement of existing boarding float with substitute float of approximately same size and driving of additional anchorage piling to anchor the boarding float, and/or relocation of the existing landing facility to an area approximately eighty feet south of the existing facility.

2. The Board of Directors of the GOLDEN GATE BRIDGE, HIGHWAY AND TRANSPORTATION DISTRICT has determined that the project will not have a significant effect on the environment.

3. Reasons Supporting Negative Declaration: Modifications of the existing facility are minor in nature, resulting in no increase in capacity, increase in size, or increase in elevation over the existing facility. Any relocation of the facility that may take place will be for a temporary period of time only, similarly will provide for no increase in capacity, size or elevation over the existing facility, would be accomplished so as to enable continued rendition of public ferry transit service during the period of planning and/or construction of proposed permanent facilities (the environmental aspects of which are presently being studied as part of environmental impact report procedures), and will be completely removed following the intended period of use. Levels of service will be maintained to present level during period of use of the temporary facility. Capacity of vessels will be limited to 596 persons.

4. An Initial Study has been prepared by the District. A copy of the Study may be obtained at the District's office at P.O. Box 9000, Presidio Station, San Francisco, California 94129.

Dated: June 5, 1974

Dale W. Luehring
General Manager

EXHIBIT 2

PARK PLAZA AREA PLAN*

1st STAGE - VINA DEL MAR AND ADJACENT STREETS

Timing: 1971-72 Fiscal Year

a) Redesign present Vina del Mar Park expanding to include the present area of Park Street and an area providing connection to the waterfront opposite the ferryboat.

b) Ferryboat Plaza---design and develop a new plaza as an historic site adjacent to the entrance to the ferryboat Berkeley.

c) Resurface present street and sidewalk space on El Portal to provide a continuous surface to be used jointly by pedestrians and service vehicles. Incorporate a turn-around into the Ferryboat Plaza.

d) Depending on the final design, some trees could be installed in the parking lot (boxed material might be appropriate).

e) Relocate taxi stand; provide space for shuttle bus parking.

f) Improve connecting walks throughout the area.

Source: William Spangle and Associates and Eckbo, Dean, Austin, and Williams, Park Plaza Area Plan a guide to action for the City of Sausalito (Sausalito: City of Sausalito, September, 1970, p. 18, 22, 26.)

g) Grade Parking Lot No. 1 to reduce the grade near the corner of Anchor and Park Streets.

h) Establish new or revised regulations to control changes in buildings on adjoining private lands - signs, materials, texture, color, etc.

i) Institute programs to encourage owner participation---work with established groups or encourage formation of new groups - sell program objectives. The program must produce benefits for property owners and merchants if they are to support it. The plan and program should:

  - Improve pedestrian flow - reduce friction.
  - Increase safety and attractiveness---a concept of walk, stop in attractive places; walk, shop in attractive shops.
  - Increase amenity within private commercial premises and maintain and improve exterior visual qualities.

j) Establish procedures to monitor impact of reduced number of parking spaces, particularly in regard to retail sales in the vicinity of the Park-Plaza, acceptance of reduced parking by local residents, change in the amount of use of adjoining parking areas (local and visitors).

k) If there is clear evidence of need for replacement parking, study the feasibility of providing parking in alternate locations.

2nd STAGE - SANDSPIT

Timing: When leasehold lands along shoreline are returned to City control.

a) Move Yacht Club.

b) Improve park area outboard of parking lot from Anchor Street to Spinnaker.

   1) Provide a small observation deck and seating area just south of the Spinnaker sub-lease area as a terminus of the boardwalk.

   2) Realign Anchor Street and the road to the Spinnaker.

   3) Install boardwalk, a walk along the water's edge designed to establish a firm shoreline and provide a feeling of intimate contact with the water.

   4) Make initial excavation for development of the cove.

   5) Install new planting, internal walks, and paving together with utilities and lighting.

c) Develop bus turnout and taxi stop off Anchor Street. This could be deferred to Third Stage.

NOTE:

The relationships shown in the plans are predicated on the assumption that the ferryboat Berkeley will remain. If the ferryboat is removed the shoreline confiuration would be modified to reflect the changed visual conditions. This decision would be made at the time actual designs were executed for the Second Stage development. Designs for changes to be made in Stages 1, 2, and 3 should be developed to permit work to be done in smaller increments if necessary.

3rd STAGE - OPEN GREEN (FORMER PARKING AREA)

Timing: On Completion of Stage 2.

a) Remove remaining auto parking from the Park-Plaza Area and convert the space to park use, completing the park design. Install alternate parking facility if needed (Marinship or to the south of Princess Street).

b) Develop the cove and projections as a water-land focal feature of the Park-Plaza Area. Include a series of steps or levels down into the water to provide constantly changing relationships between people and water as the tide rises and falls. Development and specific design will depend on whether the ferryboat Berkeley stays or is moved. Either condition can be accommodated; it is a matter of choice. The boat itself is an attractive visual feature, but it does break up what would otherwise be a more sweeping view of the bay and San Francisco.

EXHIBIT 3

RESOLUTION NO. 2229

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SAUSALITO IN SUPPORT OF THE GOLDEN GATE BRIDGE, HIGHWAY AND TRANSPORTATION DISTRICT ACQUISITION OF FEDERAL FUNDS

WHEREAS, the Golden Gate Bridge, Highway and Transportation District has sought or proposes to seek Federal Assistance, under the Urban Mass Transit Act of 1970, for the acquisition of additional ferryboats and busses to serve the transportation needs of the people of San Francisco, Marin and Sonoma Counties; and

WHEREAS, the District will hold a public hearing on Friday, May 21, 1971, at the Administration Building to hear the views of those who may be interested in the District's proposal; and

WHEREAS, the people of the City of Sausalito have a vital interest in the improvement of transportation facilities across the Golden Gate Corridor other than by private motor vehicle.

NOW, THEREFORE, BE IT HEREBY RESOLVED that:

(1) the City Council of the City of Sausalito offers its full support of the proposal of the Golden Gate Bridge, Highway and Transportation District, for acquisition of Federal Funds for the purpose aforesaid;

(2) favorable consideration be given to this proposal by those responsible for administering the Federal funding project under the 1970 Act;

(3) a representative of the City's Staff be directed to be present at the hearing of May 21, 1971, at the District's Administration Building and to read this Resolution into the record.

PASSES AND ADOPTED by the Sausalito City Council at a regular meeting held on May 18, 1971, by the following vote:

AYES: Councilmen: Dunphy, Fraser, Hicks, Sweeny, Mayor Imlay
NOES: Councilmen: None
Absent: None

Mayor of the City of Sausalito

Attest:

City Clerk

EXHIBIT 3

RESOLUTION NO. 2229

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SAUSALITO IN SUPPORT OF THE GOLDEN GATE BRIDGE, HIGHWAY AND TRANSPORTATION DISTRICT ACQUISITION OF FEDERAL FUNDS

WHEREAS, the Golden Gate Bridge, Highway and Transportation District has sought or proposes to seek Federal Assistance, under the Urban Mass Transit Act of 1970, for the acquisition of additional ferryboats and busses to serve the transportation needs of the people of San Francisco, Marin and Sonoma Counties; and

WHEREAS, the District will hold a public hearing on Friday, May 21, 1971, at the Administration Building to hear the views of those who may be interested in the District's proposal; and

WHEREAS, the people of the City of Sausalito have a vital interest in the improvement of transportation facilities across the Golden Gate Corridor other than by private motor vehicle.

NOW, THEREFORE, BE IT HEREBY RESOLVED that:

(1) the City Council of the City of Sausalito offers its full support of the proposal of the Golden Gate Bridge, Highway and Transportation District, for acquisition of Federal Funds for the purpose aforesaid;

(2) favorable consideration be given to this proposal by those responsible for administering the Federal funding project under the 1970 Act;

(3) a representative of the City's Staff be directed to be present at the hearing of May 21, 1971, at the District's Administration Building and to read this Resolution into the record.

PASSES AND ADOPTED by the Sausalito City Council at a regular meeting held on May 18, 1971, by the following vote:

AYES: Councilmen: Dunphy, Fraser, Hicks, Sweeny, Mayor Imlay
NOES: Councilmen: None
Absent: None

Mayor of the City of Sausalito

Attest:

City Clerk

EXHIBIT 4

RESOLUTION NO. 2333

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SAUSALITO PERTAINING TO FERRYBOAT TERMINALS IN SAUSALITO

WHEREAS, an interest has been generated by the Golden Gate Bridge Highway and Transportation District to provide ferryboat terminals in Sausalito; and

WHEREAS, the residents of Sausalito recognize the desirability of a ferryboat service between Sausalito and San Francisco for commuter and visitor traffic as a means of improving environmental conditions; and

WHEREAS, the residents of Sausalito are extremely concerned with maintaining Sausalito as a residential oriented community; and

WHEREAS, the residents of Sausalito will strive to preserve and enhance the unique visual characteristics of its waterfront; and

WHEREAS, it is the general objective of this community to substantially reduce parking facilities in the downtown area as alternatives are developed and to improve the related traffic patterns; and

WHEREAS, it is the general consensus that the downtown area is not to become a major transportation hub for commuters and visitors transported by private automobiles or buses; and

WHEREAS, Sausalito residents have indicated acceptance of a ferry facility in both north and downtown Sausalito.

NOW, THEREFORE, BE IT RESOLVED that the people of Sausalito oppose any ferryboat terminal in the downtown area or in the northern end of town that is in conflict with the specific characteristics of each location and the objectives of this community as a whole; and

that a possible major ferry terminal and/or parking facility in the northern end of town shall have a direct means of access to and from Highway 101, so as not to have auto or bus traffic generated by such terminal interfere with local traffic circulation patterns; and

that such terminal in the north shall be minimum in size, with a low profile, planned with the least amount of visual obstruction and designed in harmony with the Sausalito character; and

that in the event only a downtown "Whistle Stop" is considered by the Golden Gate Bridge, Highway and Transportation District, such facility to have no buildings other than minimum shelter of any kind and that a mutually acceptable shuttle service be provided from a parking facility in Marinship to that terminal facility both weekdays and weekends; and

that no concessionaires' stalls for the sale of beverages or any type of merchandise including ticket booths be permitted; and

BE IT FURTHER RESOLVED that the City of Sausalito will cooperate with the Golden Gate Bridge, Highway and Transportation District in solving mutual problems; and

that the City of Sausalito reserves the right to review all plans and specifications by its staff and/or consultants and Sausalito citizens groups for approval of any firm proposal.

PASSED AND ADOPTED by the City Council of the City of Sausalito at a regular meeting held on the 20th day of June, 1972, by the following vote:

AYES: Councilmen: Dunphy, Fraser, Heynneman, Stanford, Mayor Sweeny
NOES: Councilmen: None
Absent: None

Signed Robin R. Sweeny
MAYOR OF THE CITY OF SAUSALITO

Attest: Miriam B. Ansell
City Clerk

EXHIBIT 5

RESOLUTION 2373

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SAUSALITO IN RESPONSE TO THE REQUEST FROM THE GOLDEN GATE BRIDGE, HIGHWAY AND TRANSPORTATION DISTRICT ON FERRYBOAT TERMINAL POLICY STATEMENT

WHEREAS, the Golden Gate Bridge, Highway and Transportation District has requested from the City of Sausalito a statement of policy in regard to the Master Plan encompassing the Vina Del Mar Park and waterfront areas in the City for the proposed ferryboat terminal; and

WHEREAS, the District is required to provide an Environmental Impact Statement concerning the specific proposal and seeks in addition comments in regard to the Sausalito Yacht Club and the ferryboat Berkeley.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SAUSALITO MAKES THE FOLLOWING STATEMENT:

The City Council hereby wishes to notify the Golden Gate Bridge, Highway and Transportation District of its desire to see the ferryboat Berkeley, the first screw driven ferryboat of its class on the Bay, incorporated if possible into ferryboat landing plans as currently being developed by the District in the downtown waterfront area at the Foot of El Portal, provided that adequate provision is made for hull maintenance, salvage and upkeep, if required;

It should also be understood that the City's position in this regard does not constitute concurrence with or approval of the Golden Gate Bridge, Highway and Transportation District's plans, since such action should await rather than precede preparation of the Environmental Impact Report on the District's proposals. The Environmental Impact Report prepared by the consultants should reflect the City's position on the Berkeley, as well as the feasibility of an alternative ferry boat landing site at the Foot of Ensign or Johnson Streets, possibly in the form of a pier extending over these streets;

The Environmental Impact Report and the District should also respond to the serious concerns of the City expressed in the Mayor's letter of November 14, 1972 and the City of Sausalito Resolution 2333, as passed by the City Council in June, 1972, pertaining to ferryboat terminals in Sausalito. The Environmental Impact Report guidelines passed by the City Council pertaining to possible Golden Gate Bridge, Highway and Transportation District ferryboat landings should also be incorporated into any Environmental Impact Report study made by the consultants.

PASSED AND ADOPTED by the City Council of the City of Sausalito at a regular meeting held on the 20th day of February, 1973, by the following vote:

AYES: Councilmen: Dunphy, Fraser, Heynneman, Stanford,
Mayor Sweeny

NOES: Councilmen: None

ABSENT: Councilmen: None

MAYOR OF THE CITY OF SAUSALITO

ATTEST:

CITY CLERK

EXHIBIT 6

SAUSALITO CITY COUNCIL

EXCERPT FROM MINUTES

MEETING OF APRIL 9, 1974

Councilman Sweeny moved that the Council tonight, with a sense of urgency, support the position of over 640 registered voters and the major speakers here tonight in calling for present level and capacity of the ferry service.

Councilman Autumn seconded.

Voting on the motion;

AYES: Councilmen: Autumn, Sweeny, Mayor Heynneman

NOES: Councilmen: Rappa, Stanford

Councilman Sweeny moved that the City Council appoint a Committee consisting of the persons suggested by Mayor Heynneman (Mr. Paul Meserve, Mr. Logan Eisele, Mr. Anthony Compodonico, Councilman Robin Sweeny, Councilman Violeta Autumn, and Mr. Herb Case) to formulate a policy statement in regard to the ferryboat system which the Council could act on at its meeting next Tuesday (April 16, 1974) to forward to the Bridge District Board with the express request for a written reply from the Board within one week, and with copies of the policy statement to be sent to the appropriate legislators in Sacramento and the appropriate persons at the Urban Mass Transportation Administration.

Mayor Heynneman seconded.

Voting on the motion:

AYES: Councilmen: Autumn, Rappa, Sweeny, Mayor Heynneman

NOES: Councilmen: Stanford

EXHIBIT 7

MOTION OF THE CITY COUNCIL OF THE CITY OF SAUSALITO

The Golden Gate Bridge, Highway and Transportation District's proposed new ferryboat, as compared to the existing ferryboat, would establish a capability for a transit system of a scale and operation incompatible with Sausalito's General Plan adopted by the City Council of Sausalito on December 10, 1970.

THEREFORE, The City Council of Sausalito, acting as elected representatives of the citizens of Sausalito, do hereby oppose the enlargement or expansion of Sausalito's existing ferry terminal and/or services to accommodate the new S-165, 750 passenger capacity ferryboats.

PASSED and ADOPTED by the City Council of the City of Sausalito at a regular meeting held on the 15th day of April, 1974.

APPENDIX B

CLIMATE AND AIR QUALITY REPORT

by

Albert Miller

Consulting Meteorologist

The Potential Impact of the Sausalito Ferry Terminal Development on Climate and Air Pollution

by

Albert Miller

Consulting Meteorologist

June 10, 1974

Table of Contents

Section Page

1 The potential impact on climate and air pollution 1

2 The land use plan 3

a) Surface changes 3

b) Emissions into the atmosphere 3

3 The climate of the region 8

4 Air pollution in the region 16

5 Effect of proposed Sausalito Ferry Terminal on climate and air pollution . . 20

a) Atmospheric concentrations of pollutants 20

b) Climatic effects 24

6 Conclusions and recommendations 26

7 References 27

8 Sources of data 28

might produce a significant change within a distance of a mile or two but the climatic change may be undetectable at a distance of 10 miles. Similarly, the air pollution contribution of a single factory or automobile may be undetectable when diluted by the atmosphere over an entire county but may be noticeable close to the source when atmospheric conditions are right.

Since there are no established standards for evaluating the significance of predicted climatic changes, these must be considered in a qualitative fashion. However, in the case of air pollution, there are State and Federal Air Quality Standards; the conclusions of this report will be based on the effect of project-generated air pollution on meeting these standards.

1. The potential impact on climate and air pollution

There are two principal ways in which a development might affect the climate and "air quality" of an area: (a) Changes in the existing characteristics of the earth's surface affect the exchange of heat and momentum between it and the air above it. Both the temperature and movement of air, particularly in the lowest 50 feet of the atmosphere, are largely determined by the characteristics of the underlying surface. (b) Pollutants and heat injected into the air are, in themselves, climatic changes; they may induce further change by altering with the natural heat exchange processes. In addition, of course, pollutants are themselves considered to be undesirable air constituents.

This report considers the influence of the proposed development on the atmospheric environment brought about by (a) changes in the physical properties of the ground surface and (b) emissions of pollutants and heat into the air. It should be stressed that this is not a "research" report, but an appraisal of the effects, based on existing climatological and air pollution data. No "on-site" measurements have been made. The evaluation of this development's effect on climate and smog is stated as a function of distance from the development, or elements within it, since the potential magnitude of the impact tends to be "diluted" as one moves away from the source. Thus, a one square mile development

3. The climate of the region

The climatic setting of the area must be considered in evaluating the changes that might be caused by a development as well as the levels of air pollution that might be produced. The dominant factor that determines the climates of the entire San Francisco Bay Area is its proximity to the Pacific Ocean. The large scale flow of air is such that its path is almost invariably from the ocean. This maritime influence, which tempers the climate, falls off sharply with distance from the ocean and bay waters.

To illustrate, the mean monthly temperature over the Farallon Islands ranges between 51°F (January) and 55°F (October); in the city of San Francisco, the mean temperature ranges between 51°F and 62°F (Table 2A); while at Hamilton Air Force Base, 46°F to 66°F (see Table 3A). The annual temperature range at Sausalito is a little greater than that at San Francisco - between 50° and 63°F.

The coastal hills to the west and northwest of Sausalito play an important role in channeling the air flow and thus the climate of the area. During the summer half of the year - May to October - when there are few storms and the flow along the Pacific coastline is almost invariably from the northwest, much of the marine air reaches Sausalito via the Golden Gate, rather than directly from the coast.

Table 2. Climatological Data at San Francisco.

	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
					A. Monthly Mean Temperature (°F)							
Mean Max.	55.8	58.6	60.7	61.9	63.4	65.0	64.3	64.9	68.9	68.3	63.7	57.5
Mean Min.	45.5	47.3	48.6	49.5	51.3	53.1	53.3	53.9	55.1	54.4	51.0	47.4
Mean	50.7	53.0	54.7	55.7	57.4	59.1	58.8	59.4	62.0	61.4	57.4	52.5
					B. Monthly Mean Rainfall (Inches)							
Precip.	4.55	3.66	2.93	1.44	0.63	0.14	0.01	0.04	0.22	0.89	2.00	4.27
					C. Prevailing Wind							
Dominant irection:	N	W	W	W	W	W	W	W	W	W	W	N
Mean Wind peed (mph):	6.7	7.5	8.5	9.5	10.4	10.9	11.2	10.5	9.1	7.6	6.3	6.5

(Mean speed, year: 8.7 mph)

D. Annual Frequency of Wind Direction

Direction:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CAL
requency, %:	1.3	1.2	2.9	2.6	3.0	2.6	4.1	2.7	3.3	3.0	4.8	5.5	18.7	21.8	14.2	1.7	6.8
Mean Speed, mph:	9.2	8.1	6.8	6.4	6.2	7.0	7.1	7.5	7.3	11.8	9.0	10.8	13.2	14.0	12.1	10.3	-

Table 3. Climatological Data at San Rafael (Hamilton AFB), 1939-1970.

	ANN.	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
A. Monthly Mean Temperature (°F)													
Mean Max.	67.6	53.4	58.2	61.8	66.3	70.8	76.2	78.8	78.4	78.7	72.3	62.[illegible]	54.4
Mean Min.	46.1	38.7	41.4	42.4	44.5	47.8	51.3	51.9	52.0	51.5	48.2	43.4	40.1
Mean		46.2	50.0	52.3	55.5	59.4	63.8	65.5	65.3	65.2	60.4	53.0	47.4
B. Monthly Mean Rainfall (inches)													
% of days	16.0	36.3	32.3	28.3	19.4	9.7	2.6	0.3	1.6	2.8	11.6	24.3	32.9
$\overline{R}$(in)	27.54	6.55	4.57	3.13	1.84	0.40	0.19	0.00	0.04	0.17	1.64	3.43	5.56
C. Frequency of Rainfall, Fog, and Obstructions to Visibility (% of Hourly Observations)													
Precip.		15.6	12.0	9.7	5.9	2.5	1.1	0.2	0.4	0.8	3.6	9.2	14.1
Fog		29.5	16.2	4.7	3.3	2.3	0.8	1.9	2.5	3.8	7.8	17.9	30.8
Smoke &/or Haze		11.1	6.3	2.1	1.4	1.3	1.0	0.8	1.4	4.2	7.1	12.1	12.5
Obs. to vision		38.5	21.2	6.6	4.6	3.5	1.7	2.6	3.8	7.8	14.5	28.6	40.9
D. Monthly Mean Cloudiness (% of Sky Cover)													
Sky Cover (all hours)		6.0	5.7	5.0	4.5	3.9	3.0	2.0	2.5	2.4	3.5	5.0	6.3

Table 3. Climatological Data at San Rafael (Hamilton AFB), 1939-1970. (continued)

E. Annual Frequency of Wind Direction

Direction:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	**NW**	NNW	Calm
Frequency, %:	4.3	1.2	1.4	1.0	4.8	3.9	8.8	3.5	4.1	3.3	4.4	2.0	4.9	4.9	10.4	5.6	31.6
Mean Speed, Knots:	5.3	6.2	5.3	5.8	6.3	6.5	7.4	8.4	7.1	7.8	6.6	7.1	6.5	8.7	7.5	6.8	-

Mean annual speed: 4.8 knots.

F. Annual Frequency of Wind Speeds

Speed, Knots:	Calm	1-3	4-6	7-10	11-16	17-21	22-27
Frequency, %:	31.6	16.4	17.6	23.0	9.8	1.3	0.3

G. Mean Speed in Morning and Evening

Month:	January		April		July		October	
	Mean (Knots)	Dominant Direction	Mean (Knots)	Dominant Direction	Mean (Knots)	Dominant Direction	Mean (Knots)	Dominant Direction
6-8 am (PST):	3.9	E	3.3	NW	2.1	N	2.3	NW
9-11 am (PST):	5.1	E	6.1	SE	6.9	SE	4.7	SE
3-5 pm (PST):	5.8	E	9.1	NW	9.4	SE/NW	7.0	NW/SE
6-8 pm (PST):	5.1	E	6.1	SE	6.9	SE	4.7	SE

The typical daily cycle of flow in summer is as follows, which is illustrated by the wind data of Tables 2 and 3: During the morning, oceanic air surges through Golden Gate and over the San Francisco Peninsula as the land begins to warm up. When it reaches the San Francisco Bay, it splits into two streams, one heading southward and the other northward into San Pablo Bay. At Sausalito, this stream is typically moving from the southwest or south-southwest. The northward-moving stream spreads laterally so that the wind speed is considerably reduced when the air reaches the northern coast of San Pablo Bay from the southeast. This flow (and the southwest winds at Sausalito) increases until late afternoon then diminishes and is replaced by a weak reverse flow (northerly winds at Sausalito) after nightfall.

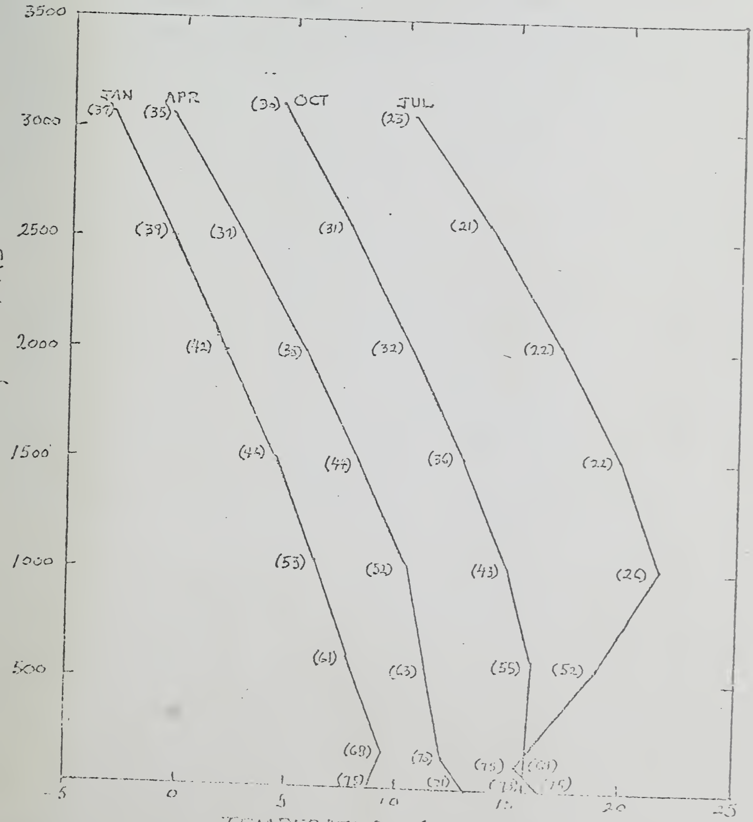
Sometimes, marine air does penetrate the hills directly from the Pacific coastline in summer. In these cases, the direction during the day is from the northwest, reaching a peak speed in late afternoon. During the night and early morning, the wind is generally light (less than 5 mph), regardless of the circulation pattern that prevails and is usually from the northwest.

During the winter months (November to March), the daily wind cycle is not nearly as regular. When storms are approaching, the winds are typically from the SSW to SSE sector and, as the storms pass, turn to NW. There are about

58 days per year with rain, most of which (53) occur during the November-to-April rainy season. Although the average wind speed is a little less in winter than in summer, the strongest peak speeds occur in winter during the passage of storms. Very weak winds and calm occur with a very high frequency in the fall and winter months in the intervals between storms. Thus, in winter, moderate wind speeds - associated with storms - are interspersed with periods of several days of very weak winds. Summer, in contrast, has a well-defined diurnal variation of wind speed, with comparatively-little day-to-day changes.

The incidence of light winds (less than 3 knots) and calm (less than 20% of the time on an annual basis, a third of the time between December and February), and the relatively low incidence of fog, haze and smoke (less than 20% of the time throughout the year, but occurring mostly in the months between November and February) indicate that atmospheric dispersion in this region is normally quite good. Poor dispersion conditions occur primarily in the Winter (December to February, inclusive). There are no vertical temperature soundings available in the immediate vicinity that might yield statistics on the depth of vertical mixing of the atmosphere. The Oakland temperature soundings (Figure 1) are not representative of the Sausalito area. However, simultaneous temperature measurements made atop

Fig. 1. Mean Monthly Temperature Soundings at Oakland at 7 p.m. (PST) [1946-1955]. (Values in parentheses: Mean Relative Humidity.)



Mt. Tamalpais and in San Francisco, plus occasional aircraft soundings that have been made provide a basis for estimating the normal conditions near Sausalito. It is likely that ground level temperature inversions are not quite as frequent at Sausalito as they are at Oakland because there is less drainage of cold air from the hills at Sausalito.

4. Air pollution in the region

The atmospheric circulation described above plays a very important role in air pollution since it determines the rate at which man-made contaminants are dispersed. During certain periods, particularly in the Fall and Winter, the atmospheric conditions sometimes produce a high pollution potential. Table 4 gives the air quality standards for contaminants produced from automobile emissions. There is no air pollution sampling station close to Sausalito, but inferences can be drawn from the stations located at San Rafael and San Francisco. Table 4 also summarizes the incidence of high pollutant concentrations during the past four years at San Rafael and San Francisco, and Figure 2 gives the average monthly variation of high-hour concentrations during a four year period at San Rafael. As can be seen from Figure 2, the high pollution months for carbon monoxide, oxides of nitrogen, and hydrocarbons are September to March while the highs for oxidants occur between June and October. The difference in behavior between oxidants and the other species of contaminants is due to the fact that oxidants are formed from the other species and atmospheric oxygen under the action of sunlight, which is most intense during the summer. (For comparison purposes, the mean high-hour oxidant level at San Rafael is generally higher than that at San Francisco, which is generally the lowest in the San Francisco Bay Area.) For other contaminants, e.g., CO and NO_2, San

Table 4. Standards for Automotive-Related Air Contaminants and Observed Concentrations at San Francisco and San Rafael.

		Standards		Observed at San Francisco (SF) and San Rafael (SR)															
Pollutant	Averaging Period	California	Federal*	No. Days Exceeded Calif. Standard in:								Maximum Value in:							
				1970		1971		1972		1973		1970		1971		1972		1973	
				SF	SR	SF	SR	SF	SR	SF	SR	SF	SR	SF	SR	SF	SR	SF	SR
Suspended Particulates	Annual+ 24 hours	60 µg/m3 100 µg/m3	60 µg/m3 150 µg/m3	0 NA	0 4	0 1	0 6	0 1	0 5	0 7	0 3	NA NA	44 136	NA 128	46 125	NA 101	NA 113	NA 180	NA 110
Carbon Monoxide	12 hours 8 hours 1 hour	10 ppm – 40 ppm	– 9 ppm 35 ppm	– 1 0	0 0 0	– 9 0	0 0 0	– 10 0	0 0 0	– 4 0	0 0 0	– 10 25	8.2 NA 19	– 10 26	7.8 NA 18	– 10 24	7.6 NA 18	– – 15	7.5 NA 17
Oxidants	1 hour	0.10 ppm	0.08 ppm	6	41	3	21	1	5	2	2	.20	.24	.19	.18	.08	.17	.12	.12
Nitrogen Dioxide	Annual 1 hour	– 0.25 ppm	0.05 ppm –	– 7	– 0	– 1	– 0	– 2	– 0	– 0	– 0	– .42	– .17	– .27	– .12	– .33	– .14	– .21	– .19
Lead	30 days	1.5 µg/m3	–	0.8 2.8	0.4 2.6	1.1 4.5	0.7 2.7	0.4 2.2	0.3 2.6	NA	NA	NOT AVAILABLE							
Hydrocarbons	3 hours (6-9 am)	–	0.24 ppm																

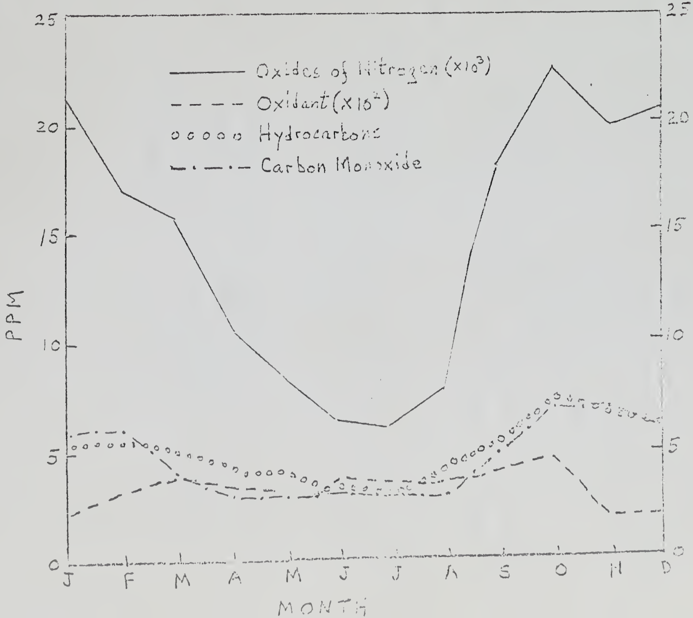
*Lower (secondary) standard, when prescribed.

+Geometric mean

ppm: parts per million

µg/m3: micrograms per cubic meter

Fig. 2. Mean of High Hour Concentrations of Pollutants at San Rafael (Oct. 1968-Sept. 1973).



Francisco has considerably higher values than does San Rafael. These other species are highest when the dispersive power of the atmosphere is least. This occurs in winter, when there are many periods of weak winds and mixing in the vertical is least due to the frequent occurrence of temperature inversions near the surface, particularly in the morning. Thus, the peak CO and NO_x concentration occurs in the winter at about 8 a.m. and between 6 and 10 p.m.; these times coincide with the peak traffic and minimum capability of the atmosphere to disperse contaminants. Oxidants, on the other hand, reach their peak concentration near midday in summer and early fall.

In summary, the oxidant level at Sausalito should be about the same as that observed at San Francisco while the levels of other contaminants should be close to those observed at San Rafael.

The only existing pollution sources of significance near Sausalito are highways. The largest of these is route 101 traffic. The source strength of this highway was given in Section 2 of this report.

Table 1. Peak Hour Emissions from Ferries, Automobiles and Buses in Sausalito.

Source	a	b	c	d
1. Ferries				
(a) In terminal	15	3.8	0.32	0.7
(b) On bay, full power	45	0.8	0.83	0.14
	e	f	g	h
2. Buses (On Bridgeway)				
(a) Weekdays	22	.025	.039	.005
(b) Weekends	8	.009	.014	.002
3. Automobiles (On Bridgeway)				
(a) Existing	1300	4.44	0.34	0.34
(b) Generated by terminal now, weekends	40	0.14	0.01	0.01
(c) Generated by terminal now, weekdays	80	0.28	0.02	0.02
(d) Generated by proposed operation, weekends	102	0.35	0.03	0.03
(e) Generated by proposed operation, weekdays	160	0.55	0.04	0.04

a: Idling time (minutes) in terminal during peak hour.

b,c,d: Emission rates, grams/sec, of (a) carbon monoxide, (b) sulfur dioxide, and of (c) oxides of nitrogen and hydrocarbons. Based on fuel consumption of 600 lb/hr. during idling and 1560 lb/hr. at full power; 0.2% sulfur content in fuel.

e: Number of vehicles per hour.

f,g,h: Emission rates, mg/ft/sec of (f) CO, (g) NO_x, and (h) HC. Based on automobile current average of 65 grams/mile for CO and 5 grams/mile for NO_x and HC. If projected rates are achieved, the source strengths shown will be reduced to about one fourth. Buses: 22 gm/mi. of CO, 34 gm/mi. of NO_x, and 4 gm/mi. of HC.

Table 5. Computed Pollutant Concentrations* (ppm) at Various Distances from Source in Sausalito during Peak Hour Traffic.

Distance Downwind	Normal Meteorological Conditions		Severe Meteorological Conditions (Fall/Winter)	
	CO	NO_x/HC	CO	NO_x/HC
A. Ferries				
300 ft.	<0.01	<0.01	0.13	0.01
600 ft.	<0.01	<0.01	0.05	<0.01
1000 ft.	<0.01	<0.01	0.01	<0.01
B. Automobiles, on Bridgeway, total (Terminal generated:)				
300 ft.	0.01 (<0.01)**	<0.01 (<0.01)	1.33 (0.11)	0.09 (<0.01)
600 ft.	<0.01 (<0.01)	<0.01 (<0.01)	0.47 (0.04)	0.03 (<0.01)
1000 ft.			0.32 (0.03)	0.02 (<0.01)
1 mile			0.04 (<0.01)	<0.01 <0.01

* Mean hourly, above ambient levels.

** ( ) = Contribution by terminal generated traffic.

7. References

Ahrens, D. and A. Miller: Variations of the Temperature Inversion over the San Francisco Bay Area, 1969.

Bay Area Air Pollution Control District: Contaminant and Weather Summary, 1963-1973.

California Air Resources Board: California Air Quality Data, 1967-1973.

Csanady, G.T.: Turbulent Diffusion in the Environment, 1972.

Miller, A.: Smog and Weather, 1967.

Miller, A. and Ahrens, D.: Ozone Within and Below the West Coast Temperature Inversion, 1969.

Miller, A. and J.C. Thompson: Elements of Meteorology, 1970.

National Weather Service: Climatological Summaries for California, 1950-1972.

Priestley, C.H.B.: Turbulent Transfer in the Lower Atmosphere, 1959.

San Jose State University Meteorology Department: Summaries of Winds and Temperatures, 1973.

Slade, D.H. (editor): Meteorology and Atomic Energy, 1968.

Stern, A.C., et al.: Fundamentals of Air Pollution, 1973.

Williams, W.A., and R.E. DeMandel: Land-Sea Broundary Effects on Small-Scale Circulation, San Jose State University Report, 1966.

Williamson, Samuel F.: Fundamentals of Air Pollution, 1973.

8. Sources of data

Bay Area Air Pollution Control District: Contaminant and Weather Summary, 1963-1973.

California Air Resources Board: California Air Quality Data, 1967-1973.

National Weather Record Center, Asheville, North Carolina: Hourly Wind Observations at San Francisco and San Rafael.

National Weather Service: Climatological Summaries for California; 1950-1972.

San Jose State University Meteorology Department: Summaries of Winds and Temperatures, 1973.

APPENDIX C

ECOLOGICAL SURVEY

by

Dr. H.T. Harvey and Dr. J.P. Heath

SAUSALITO FERRY TERMINAL
ECOLOGICAL SURVEY

by

Dr. H. T. Harvey & Dr. J. P. Heath

April 23, 1974

Introduction. Along the shores of San Francisco Bay salt marshes and mud flats are of prime concern as wildlife habitats. The site of the proposed redevelopment of the Sausalito Ferry Terminal is located almost entirely within the shallow and deep water habitats of the Bay. Shallow water being defined as water covered areas between mean lower low water (MLLW) and minus six feet and deep water as those areas below minus six feet. The rocky (concrete blocks) shore and pilings contribute diversity of substrate that enables a variety of specially adapted organisms to thrive. The proposed development therefore would seem to have its greatest impact on the marine organisms of the shallow and deeper waters. Thus this survey emphasizes the benthic organisms of the proposed dredge site and those immediately adjacent.

Biota of the Site.

Benthos-Ten stations were selected, four of which were within the proposed dredge area and six surrounded it. Over thirty-two liters of sediment were examined for benthos, or an everage of three and a fifth liters per station. Sampling and determinations were performed by Jan Kankrlif and Mark Kehoe of the Marine Ecological Institute. A Polmar dredge was used for sampling, after which the material was screened first through a 1 mm. screen then a 0.2 mm. screen. Specimens of each species were collected, cataloged and preserved

and are presently stored at the Marine Ecological Institute. The data sheets are to be found in Appendix A, with a map of the sampling stations.

A cursory inspection of the station's biota within the dredge site and those outside reveal no great differences. Only the occurrence of a few unique individuals in one or two samples hint at minor differences. An example is the two sea pens (stylatula elongata) at station eight which is the only sample containing such organisms. Nereid worms, nematodes, amphipods and mussels were commonly found in both areas. Thus, the region seems to have a moderate population exemplary of those portions of the Bay that are not especially rich or poor in biota. Due to the constraints of time, the seasonal differences and a higher intensity of sampling were unassessable. Other studies in the Bay indicate that both the species present and the relative abundance of each species vary during the year for a given site.

Although dredging the proposed site will disturb the species known to inhabit the site, it is unlikely that much of a long range effect will be noted. First, the area is relatively small and it is highly probable that the area will be rapidly invaded by the same species from the adjacent environment. It is difficult to predict what the population densities of the various forms will be after the dredging operation.

Fish - The proposed development will probably alter the fish population very little in as much as some pilings (the old ferry slip) will be removed and new ones added. The pilings provide a substrate for a variety of invertebrates and algae that serve as food for a favorite food fish the pile perch (Rhacochilus vacca). Provision should be made with the new terminal to continue to provide fishing sites for this and other species such as the rubber lips perch (Rhacochilus toxotes) and the starry flounder (Platichthys stellatus). These three species were reported caught regularly by fishermen interviewed at the terminal site. There are about ten to fifteen additional species of fish that undoubtedly occur in the waters of the site and a few are occasionally caught such as the bullhead or staghorn sculpin (Leptocottus armatus).

The site is within the known range of spawning area of the Pacific herring and thus the shoreline should not be altered greatly from its present configuration of a rocky profile (Skinner, 1962).

Birds - The site provides some usable habitat for bird species such as gulls and waterfowl. However, due to the small size of the area and the high human activity it is unlikely that the planned alteration will produce much measurable change in the species or numbers of birds in the Richardson Bay area. It is in a portion of the Bay that was

rated only fair as a wildlife habitat by DeLisle (1966). There are no marsh plants in the immediate region so the endangered clapper rail is not present nor are there suitable sites for least terns, the other endangered bird species of the Bay environment.

Plants - Although not profuse in their growth, marine algae cover the rocky shoreline pilings and were dredged up from the bottom during sampling for the benthic animals. All three major groups, green, red, and brown algae are present. Typical small, rock-covering forms such as sea lettuce and rockweeds were noted. Microscopic examination would undoubtedly yield various species of blue-green algae and diatoms as well. Due to their ubiquitous nature and rapid means of propagation it seems highly probable that though some disruption of plants would occur during the construction phase, recovery would be rapid and plant life would continue much as it is today.

Ecological Impact - Although each of the categories of the above biota will suffer some negative impact during the construction phase of the project, it is unlikely that significant impairment will result in the long run. There are several other criteria and factors that lead us to this conclusion.

First, the area in question is devoid of either marchland or mud flat habitat. Although shallow waters and deep

waters of the Bay are significant habitats for many species they are in no way threatened with destruction to the degree that marshes are threatened (Harvey, 1966). And in this case it is largely a question of modification rather than total destruction.

Second, no rare or endangered species are known to depend on the ecosystems within the site. The potential species of concern, the salt marsh harvest mouse, the clapper rail and the least tern are not known in the area and would not be expected to occur there either.

Third, anadromous fish migration through Richardson Bay is minimal and to impede movement very minimally, if at all.

As indicated earlier wildlife values are considered to be of only fair importance with few fish or waterfowl species depending on this area. Only the potential of herring spawning would seem a relevant fact. Also, there is no indication in Wooster's studies (1971, 1972) that this is an important site for shellfish or game fish.

Therefore, in conclusion, it appears that minimal damage will be done to the native biota by the proposed development, however the maintenance of the dredged depths required and the disposal of spoils will be a renewing problem.

Mitigation - Although little damage may be done, the

constant demand for dredging and the subsequent disposal of spoils will have a negative effect on life in the Bay. Two mitigation avenues should be explored, namely creation of favorable habitat and access to fishing at the site, and second, the acquisition and dedication to the public of nearby marshland. Specifically, on the latter subject either the marshes immediately NW of Sausalito south of the Highway 101 bridge or portions of the so called Bothin Marsh would seem appropriate.

LITERATURE CITED

DeLisle, Glenn. 1966. Preliminary Fish and Wildlife Plan San Francisco Bay Estuary. Rept. to S.F.B.C.D.C. from Calif. Dept. of Fish and Game.

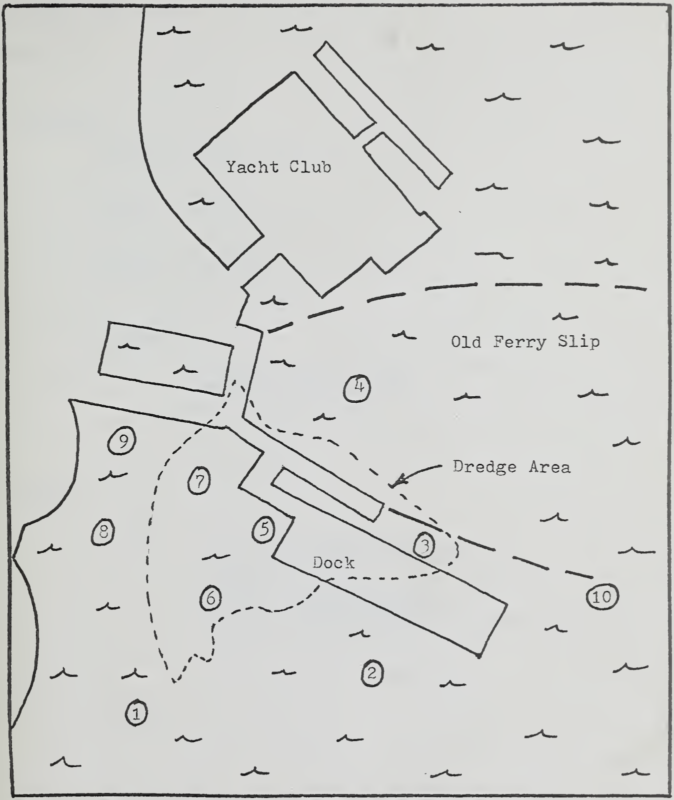
Harvey, H. T. 1966. Some Ecological Aspects of San Francisco Bay. S.F.B.C.D.C. 31pp.

Skinner, J. E. 1962. Fish and Wildlife Resources of the San Francisco Bay Area. Calif. Dept. of Fish & Game, Water Prof. Br. Rept. #1. 225pp.

Wooster, T. W. 1972. Shellfish Study, San Francisco Bay. Report to Calif. Dept. of Fish and Game. Mimeo 65pp.

Wooster, T. W. 1971. Occurrance of juvenile Forage and game fishes over intertidal mud flats of the San Francisco Bay complex. Anad. Fish. Br. Admin. Rept. No. 71-2. Calif. Dept. of Fish & Game.

APPENDIX A



Sausalito Ferry Terminal Sampling Sites for Benthic Animals.
(① = Site number and location)

SAUSALITO FERRY DOCK

STATION #1 :

SEDIMENTS:

TEXTURE: Sandy, Silty Clay

COLOR: Grey

VOLUME: 4600 ml

COMMENTS:

Large particle detritus, less than 1%
Fine sand, less than 1%

BENTHOS:

FAUNA:
Polychaetes - Nereids (5)
Tube worm - Asychis amphiglypta (1)
Nematoda
Amphipods - Gammaridae (10) undetermined
Fish eggs - Approximately 30
Approximately 300 nematodes, average length 5 mm

FLORA:

ADDITIONAL COMMENTS:

Clam Siphons - 4 large siphons measuring 1 X 3 cm but no clams.

Due to the absence of any good references on so many Pacific Coast amphipods, some forms could only be taken to suborder, i.e., Gammaridae.

SAUSALITO FERRY DOCK

STATION # 2:

SEDIMENTS:

TEXTURE: Sandy clay

COLOR: Black-grey

VOLUME: 5000 ml

COMMENTS:

Less than 1% sand
Large particle detritus and tree leaves, approx. 5%
Sediment tended to clump after washing, left an oily slick on water in wash basin.
Empty tubeworm tubes, old, broken.

BENTHOS:

FAUNA:

Tubeworm - Pectinaria californiensis (1)
Polychaeta - Nereid worms (4)
Amphipoda - Gammaridae (50) undetermined.

FLORA:

ADDITIONAL COMMENTS:

SAUSALITO FERRY DOCK

STATION # 3:

SEDIMENTS:

TEXTURE: Clay

COLOR: Grey-black

VOLUME: 2300 ml

COMMENTS:

Broken shell material constituted approximately 25% of total sample.
Garbage - paper, plastic, adhesive tape, broken bottles.
Odor - not unlike that of old, wet garbage (not H_2S).

BENTHOS:

FAUNA:

Mussels - Mytilus edulis (2) approximately 25 mm
Brown snails - Lacuna spp. (5)
Colonial Hydroid - Obelia spp.
Bryozoan - Bugula pacifica
Sessile Barnacles - Balanus improvisus approximately 200
Nematode worms approximately 300
Isopod - Pentidotea spp.

FLORA:

Most of the alga growth throughout the entire sampling area was too immature to classify properly but almost all specimens obtained belonged to the Division Phaeophyta (brown algae). Even though some specimens were an atypical greenish-brown, they showed the typical structure of the Laminariales. These plants appeared as dense growths on the dock & bumpers of the ferry landing & supported a large population of amphipods, nereids, & mussels.

ADDITIONAL COMMENTS:

Shells of bent-nosed clam - no live specimens.
Crab legs - no crabs. (approximately a dozen assorted)
Tooth of a large mammal.

SAUSALITO FERRY DOCK

STATION # 4:

SEDIMENTS:

TEXTURE: Silty clay

COLOR: Black

VOLUME: 2200 ml

COMMENTS:

At least 50% of the sample consisted of garbage - old fishing lines, aluminum and tin cans, pieces of plastic and wood.
Large amounts of yard scraps (tree leaves, twigs, grass clippings, plant stems).
Strong odor of sulphides.

BENTHOS:

FAUNA:

Snails - *Mitrella carinata* (10)
Barnacles - *Balanus improvisus*, approximately 100
Several pieces of Nereid worms.
Colonial Hydroid - *Obelia* spp.
Bryozoan - *Bugula pacifica*
Mussel - *Mytilus edulis* (juvenile - 1)
Shrimp - *Spirontocaris taylor* (juveniles - 2)
Amphipod - *Elasmopus antennatus* (1)
Polychaetes - Nereids (2)

FLORA:

See discussion Station 3.

ADDITIONAL COMMENTS:

Several thousand barnacles on smooth surfaces of trash.
Density = 9/sq. cm. Average size = 1 mm.
Several hundred fish eggs throughout sample.
Scrappings of pilings in this area yielded a dense growth of *Balanus glandula*.

SAUSALITO FERRY DOCK

STATION # 5:

SEDIMENTS:

TEXTURE: Silty clay

COLOR: Dark grey/black

VOLUME: 4500 ml

COMMENTS:

Many old mud tubes - Asychis (no worms), approx. 3 dozen.
Sand less than 1%.
Strong sulphide odor.
Many creosoted wood chips, left interference rings on wash-water surface.
Large animal bones (mammalian ribs)

BENTHOS:

FAUNA:

Tube worm (tubes only) - Pectinaria (3)
Nereid worms (20)
Leech
Clams - Macoma nasuta (3)
Amphipods - Gammaridae (28) undetermined.

FLORA:

ADDITIONAL COMMENTS:

Many empty Macoma shells (juveniles), approx. 50.
Shells of larger clams, blackened.

SAUSALITO FERRY DOCK

STATION # 6:

SEDIMENTS:

TEXTURE: Sandy, Silty Clay

COLOR: Grey-Green

VOLUME: 3800 ml

COMMENTS:

Sediment approximately 20% large particle detritus, leaves and wood chips. Wood chips left creosote blobs on surface of wash water. 6 large tubes of Asychis (no worms).

BENTHOS:

FAUNA:

Nereid worms (6)
Clams - Macoma nasuta (5)
Undetermined oligochaetes (10)
Fish eggs
Several thousand nematodes 3 - 5 mm in length
Several thousand small oligochaetes 5 - 8 mm in length.

FLORA:

ADDITIONAL COMMENTS:

SAUSALITO FERRY DOCK

STATION # 7:

SEDIMENTS:

TEXTURE: Silty clay

COLOR: Dark grey

VOLUME: 1900 ml

COMMENTS:

10% broken shell
Many chips of red antifouling paint.

BENTHOS:

FAUNA:

Large numbers of nematodes, 1 - 2 thousand, approx. 3mm.
Amphipods - Gammaridae, approx. 36
Nereid worms (3)

FLORA:

ADDITIONAL COMMENTS:

SAUSALITO FERRY DOCK

STATION # 8 :

SEDIMENTS:

TEXTURE: Sandy Clay

COLOR: Grey-Green

VOLUME: 3670 ml

COMMENTS:

Sand content approximately 3%, broken worm tubes of Asychis (no worms).

BENTHOS:

FAUNA: Clams - Macoma nasuta (4)

Sea pens - Stylatula elongata (2) approximately 55 mm

FLORA:

ADDITIONAL COMMENTS:

SAUSALITO FERRY DOCK

STATION # 9:

SEDIMENTS:

TEXTURE: Varied

COLOR: Grey-green

VOLUME: 820 ml

COMMENTS:

Approximately 1% sand.
Sample consisted mainly of algae, rocks and refuse (fishing line, paper, wood scraps).
Approximately 50% of sediment was broken shell material. Two oyster shell fragments found.

BENTHOS:

FAUNA:

Colonial Hydroid - Obelia spp.
Bryozoan - Bugula spp.
Fish eggs
Amphipods - Elasmopus antennatus (2)
Mussels - Mytilus edulis (12) (juvenile)
Clams - Macoma nasuta (2)
Nereid worms (3)
Undetermined oligochaetes (4)

FLORA:

See discussion Station 3.

ADDITIONAL COMMENTS:

SAUSALITO FERRY DOCK

STATION #10:

SEDIMENTS:

TEXTURE: Silty clay

COLOR: Grey

VOLUME: 3400 ml

COMMENTS:

60% of sample consisted of rocks and broken concrete with individual pieces measuring 2 - 10 cm. Rocks showed evidence of old barnacle growth but only 2 living individuals were to be found. The rest was a mass of broken shell, broken worm tubes, sand (less than 1%), and burnt wood chips.

BENTHOS:

FAUNA:

Colonial Hydroid - Obelia spp.
Clams - Macoma nasuta (3): juvenile
Amphipoda - Gammaridae (5)
Sessile barnacles - Balanus improvisus (2)

FLORA:

ADDITIONAL COMMENTS:

Clam & whelk shell matter.
All in all this was the single most depauperate area in this study.

APPENDIX D

GEOLOGIC AND SOILS REPORT

by

Cooper-Clark & Associates

Foundation Engineers and Engineering Geologists

GEOLOGIC, SEISMIC, SOIL AND HYDROLOGIC ASPECTS
PROPOSED FERRY TERMINAL
SAUSALITO, CALIFORNIA

INTRODUCTION

GENERAL

This appendix presents the geologic, seismic, soil and hydrologic aspects of the Environmental Impact Report for the proposed new Ferry Terminal to be located at Sausalito Point on the west shore of Richardson Bay. For convenience in this report, these aspects are collectively labeled the "Physical Environment". This report is not intended to present all the detailed geologic, soil and foundation engineering recommendations which are presently being developed for the proposed construction. Rather, it is a compilation of data on the physical environment and an interpretation of such data in accordance with the California Environmental Quality Act of 1970, as detailed by the amended guidelines effective December 14, 1973.

TOPOGRAPHY

The landward portion of the site consists of filled land, which serves as a paved parking area, retained by a pile-supported bulkhead. Available records indicate that the fill and bulkhead were constructed in 1894. The presently existing topography is shown by contour lines on Plate A-1, Plot Plan. Spot elevations on the seaward edge of the filled land, range from 10.5 to 12.2 feet (M.L.L.W.). Underwater contours at the maximum water depth, show that the mud surface is elevation -25 feet (M.L.L.W.) within the mapped area, with the average elevation approximately -15 feet (M.L.L.W.).

REGIONAL GEOLOGY

The bedrock assemblage of the site and surrounding region consists of Franciscan Formation rocks (approximately 90 to 150 million years old), as shown on Plate A-2, Regional Geologic Map. In past geologic time, this general region has undergone repeated episodes of uplift, folding, and faulting.

San Francisco Bay is a "drowned valley" flooded by meltwater from the last continental glacier approximately 10,000 years ago. Shoreline features of San Francisco Bay are in a geologically youthful stage of erosional development. A similar situation exists where new reservoirs are constructed and a shoreline is created along the sides of previously sloping ground. It takes a number of years for erosion to cut a niche in this newly formed shoreline. This situation is especially true in Marin County, where precipitous cliffs dot the coastline due to the durable nature of Franciscan Assemblage rocks.

Franciscan rocks are strongly folded, closely jointed, and, in many places, cut by discontinuous fractures or faults and shear zones; these are generally old geologic features and result from intense folding and tectonic deformation.

The various rock types existing in the vicinity of the proposed terminal site are shown on Plate A-2.

SITE GEOLOGY

The predominant bedrock type exposed west of the site is chert. This hard siliceous rock, though highly folded and fractured, resists weathering and stands out as peaks in excess of 1,000 feet elevation only a few miles west of the site. A softer sandstone and shale is in contact with the chert just landward of the site. The sandstone and shale underlie the site, based on data from 8 borings, at various depths ranging from 25 feet to 65 feet below the ground surface. This bedrock formation is overlain by unconsolidated sediments and soft bay mud. A rubble fill has been placed over portions of the site and ranges up to 28 feet in thickness.

There are no evident faults in the immediate vicinity of the proposed terminal. However, the coastline and bathymetric topography, south of the site, exhibits a lineation suggestive of a possible offshore fault. A portion of this probable fault may be seen cutting through the rocks at Yellow Bluff, approximately 1½ miles south of the site.

SEISMOLOGY

The site's location with respect to major active or potentially-active faults is indicated on Plate A-3, Epicenters of Major Historic Earthquakes and Active, Potentially-Active Faults in the San Francisco Bay Area. Strong, destructive earthquakes have originated on the San Andreas, Hayward and Calaveras Faults, and major seismic events on these faults have shaken the site in the past. Monitoring of earthquakes with a Richter magnitude greater than 0.5 during the period 1969 through 1971 (Ref. 13) indicates that the Marin Peninsula was totally free of seismic events during this interval of time.

A recent seismic safety information map (Ref. 2) locates the site in an area that, in the last 164 years, has experienced between 11 and 15 earthquakes with apparent intensities ranging from VI to VIII. For reference, a scale of earthquake intensities is presented on Plate A-4, Modified Mercalli Intensity Scale (1931).

During the 1906 Earthquake, several north-south cracks reportedly developed in the fill in the general area of the Ferry Terminal. The fill was probably underlain by soft bay mud. However, the bulkhead wall reportedly was not damaged by this great earthquake, and the filled ground generally retained its integrity.

On March 22, 1957 (Ref. 13), the strongest earthquake since 1906 struck the area. The epicenter of this earthquake, which had a Richter Magnitude of 5.3, was located near Mussel Rock, about 13 miles southwest of the site. This earthquake, which was followed by 45 lesser temblors in the next few days, caused moderate damage in the immediate vicinity of the Ferry Terminal. However, the bulkhead and retained fill did not suffer any visible damage. The isoseismal map of the 1957 earthquake shows the site to lie within an area where the apparent intensity was VI.

A recent study (Ref. 10) indicates that the site could be subject to a tsunami (earthquake-induced sea wave). In 1964, a tsunami generated by the Alaskan earthquake of March 28, had a recorded wave height of 7.4 feet at the Presidio tide gauge. It is believed that bathymetry and friction would reduce this wave height by 25% before it reached the terminal site. Therefore, if we assume a maximum 7-foot-high tide (M.L.L.W.), the elevation flooded by such a seismic water wave would be 12.6 feet (M.L.L.W.). The highest potential tsunami wave height has been estimated at 20 feet at the Golden Gate Bridge, or 15 feet at the proposed site (Ref. 10). It is estimated that such a wave would occur on a frequency of once every 200 years.

A sieche or unusually large water wave formed within the Bay can also be generated by a seismic event, as well as by a landslide, and changes in atmospheric pressure and wind.

SOIL CONDITIONS

Subsurface conditions were explored by drilling two borings on land and six borings under water with a rotary wash-type drilling rig. The boring locations are shown on the plot plan.

At the on-land boring locations, the site is blanketed by from 26 to 28 feet of fill composed of broken rock and concrete fragments mixed with bay mud and debris. Individual clasts within the fill range from clay to boulder size. Below the fill and below the mud line under water, the site is underlain by soft bay mud ranging up to 40 feet in thickness. This soft bay mud is generally underlain either by medium loose to medium dense broken chert, with individual dimensions up to cobble size, or by sand deposits 3 to 10 feet thick, which are in turn underlain by 8 to 22 feet of stiff clayey soils. These unconsolidated deposits overlie hard, competent sandstone and shale bedrock.

Selected samples of bay mud were obtained at ½-, 3- and 6-foot depths at two locations at the proposed site. An analysis for detrimental heavy metals showed the following concentrations in milligrams per kilogram:

SITE 1 (depth in feet)	Mercury	Lead	Copper	Zinc	Cadmium
0.5	0.27	2.5	33.0	85.5	1.0
3	0.35	0.5	43.0	89.0	0.5
6	0.35	0.5	35.5	75.0	1.5
SITE 2					
0.5	0.70	4.0	41.5	141.5	0.5
3	0.23	7.5	33.0	115.0	0.5
6	0.32	2.8	31.5	76.0	0.5

The Environmental Protection Agency's maximum allowable concentrations of the above heavy metals in dredged spoil is generally 50 milligrams per kilogram, with an upper limit of 1 milligram per kilogram on mercury and cadmium.

HYDROLOGY

The hydrologic characteristics of the site are controlled by tidal fluctuation and currents; maximum tidal range is approximately 11 feet in this area.

Urbanization has modified the area's natural onshore drainage pattern. However, the natural watershed is small and contributes only a minimal amount of runoff water to this area.

PHYSICAL ENVIRONMENT IMPACTS

TOPOGRAPHY

This project will not affect the topography, since the proposed structure will be on piles, no dredging is planned, and no on-shore grading or paving will be done.

GEOLOGY

The project will have minimal impact on the site geology. With appropriate soil engineering, it also appears that the geology will have minimal impact on the project. The investigations did not reveal the presence of a fault on the site.

SEISMOLOGY

The project will have no impact on the site's seismic characteristics. The regional seismicity of the area could result in severe ground shaking at the site. To the extent that the past reflects what may happen in the future, it appears that the following earthquakes could occur within 80 miles of the site during the next 150 years:

Number of Earthquakes	Richter Magnitude
1	7.5 to 8+
4	6.5 to 7.5
26	5.5 to 6.5
160	4.5 to 5.5

SOILS

The static strength of the on-site soils appears to exceed the shear stresses that would be induced, even during a major earthquake. Consequently, there is minimal potential for major, seismically-induced ground failures. There does, however, appear to be some potential for the development of cracks in the existing fill. Also, analyses indicate that the pile-supported bulkhead should undergo serious distress during a major earthquake. However, as mentioned previously, this bulkhead survived the great 1906 earthquake without damage.

This project may result in some minor disturbance of bay mud and underlying soils by pile driving. Existing soil characteristics will have a significant impact on the proposed construction, and careful analysis of dynamic soil-pile interaction is necessary to properly design the piles to withstand seismically-induced lateral deflections of the individual soil layers. Such design is in progress. Soil stability is, to a certain extent, dependent upon the stability of the existing bulkhead which serves as a retaining structure. The calculated stability of the bulkhead should be improved and/or the proposed structure should be designed so that it would not be adversely affected by deflections or failure of the bulkhead under earthquake forces.

HYDROLOGY

The project will have minimal impact on surface or groundwater conditions.

The main Sausalito boat channel is located adjacent to this proposed site. Pier construction may affect local tidal currents and, therefore, the boat channel, and/or change the erosion-sedimentation characteristics of the immediate area. These questions are as yet unanswered and should be determined prior to final construction.

CONCLUSIONS

GENERAL

It should be recognized that the above discussion of geologic, seismologic, soil and hydrologic conditions has been developed as part of the environmental impact evaluation process. Thus, conclusions related to geologic and soil conditions are contingent upon the site-specific soil and foundation investigation presently being undertaken.

ENVIRONMENTAL IMPACT

The actual or potential impacts of the proposed project and the existing physical environment on each other include:

1. Submarine currents and erosion-siltation patterns may be altered, possibly affecting the nearby boat channel.

2. There will be a reduction in the amount of sunlight reaching the bay waters.

3. A tsunami water wave similar to the one generated by the 1964 Alaskan earthquake would reach a possible maximum elevation of 12.6 feet (M.L.L.W.); the dock elevation will be 13½ feet (M.L.L.W.), and thereby not affected. However, the highest anticipated water wave, which has an estimated frequency of once every 200 years, could reach a height of 22 feet, which would overtop and could seriously damage the structure.

4. A seiche could develop due to a seismic event or major landslide into the Bay near the site. Limited data indicate that the maximum anticipated height of such a seiche would be less than 7 feet, which should not affect the structure.

5. Differential settlement.

6. Ground cracking during a major earthquake.

7. Failure of the existing bulkhead.

8. Major earthquakes in the area would result in strong ground shaking at the site and could adversely affect the pile foundations and the superstructure.

9. Potential offshore faulting along a concealed fault.

UNAVOIDABLE ADVERSE EFFECTS

Provided the mitigation measures presented in the following section are followed, the unavoidable adverse effects from the project in its relationship to the physical environment appear to be limited to the risk associated with occupying a site which may be subject to inundation during a major seismic event occurring at great distances from the site, and possibly some localized changes in tidal currents and erosion-sedimentation characteristics.

MITIGATION MEASURES

Since the structure will be above the height of the highest recorded tsunami in San Francisco Bay, special design measures to minimize structural damage during greater tsunamis does not appear warranted. There is presently an effective tsunami warning system for the San Francisco Bay Area. Provided that an emergency evacuation system is developed, adequate to protection to life should then exist.

Design of pile foundations and superstructure should include careful consideration of soil deflections and forces that will be imposed by major earthquakes.

ALTERNATIVES

There are no presently known geologic, seismic, soil or hydrologic conditions which warrant changes in the location and/or nature of the proposed project. However, as impacts become more apparent, alternatives will be suggested if needed.

SHORT- AND LONG-TERM RELATIONSHIPS

There is an indeterminate long-term risk to health and safety associated with seismically-induced water waves. Otherwise, from a physical environment standpoint, there appears to be no relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity.

IRREVERSIBLE ENVIRONMENTAL CHANGES

Irreversible changes to the physical environment which would be involved in the proposed action appear to be limited to changes in the site appearance, reduction of sunlight to the bay waters, and possibly, localized modification of tidal currents and related submarine erosion-siltation.

PERSONNEL

This appendix was prepared by the following Cooper, Clark & Associates personnel:

Francis A. Stejer	Certified Engineering Geologist
John T. O'Rourke	Certified Engineering Geologist
Robert S. Cooper	Registered Civil Engineer

A List of References and the following plates are attached and complete this appendix:

Plate A-1	Plot Plan
Plate A-2	Regional Geologic Map
Plate A-3	Epicenters of Major Historical Earthquakes and Active, Potentially-Active Faults in the San Francisco Bay Area
Plate A-4	Modified Mercalli Intensity Scale of 1931

LIST OF REFERENCES

The following literature and maps were used in preparation of this appendix:

1. Bedrossian, Trinda L., "Geology of the Marine Headlands", *California Geology* Vol. 27, No. 4, California Division of Mines and Geology, April 1974.

2. California Division of Mines and Geology, "Earthquake Intensities", Seismic Safety Information Map 72-4, July 1972.

3. Carlson, Paul R., and David S. McCulloch, "Bedrock–Surface Map of Central San Francisco Bay, California", U.S. Geological Survey, Open-File Map, 1970.

4. Chapman, Rodger H., and Charles C. Bishop, "San Francisco Sheet", Geologic Map of California – Olaf P. Jenkins Edition California Division of Mines and Geology, Scale 1:250,000.

5. Cooper, Clark & Associates, "Data Report, Geotechnical Aspects of Seismic Safety Element for the City of San Rafael, California", A study for the urban and environmental planning firm of Duncan & Jones, Berkeley, California, 1973.

6. Greensfelder, Roger, "Maximum Expected Bedrock Accelerations from Earthquakes in California", California Division of Mines and Geology, Open-File Map, 1972.

7. Lawson, A.C. (Chairman), "The California Earthquake of April 18, 1906", A report of the State Earthquake Investigation Commission, Carnegie Institute of Washington, text and atlas, 1908.

8. Oakeshott, G.B. (Editor), "San Francisco Earthquakes of March 1957", California Division of Mines, Special Report 57, 1959.

9. Rice, Salem J. and Rudolph G. Strand, "Geology and Slope Stability in Marin County", California Division of Mines and Geology, A report prepared for the County of Marin, 1971.

10. Ritter, J.R., and W.R. Dupre, "Map Showing Areas of Potential Inundation by Tsunamis in the San Francisco Bay Region, California", U.S. Geological Survey, Miscellaneous Field Studies Map MF 480, 1972.

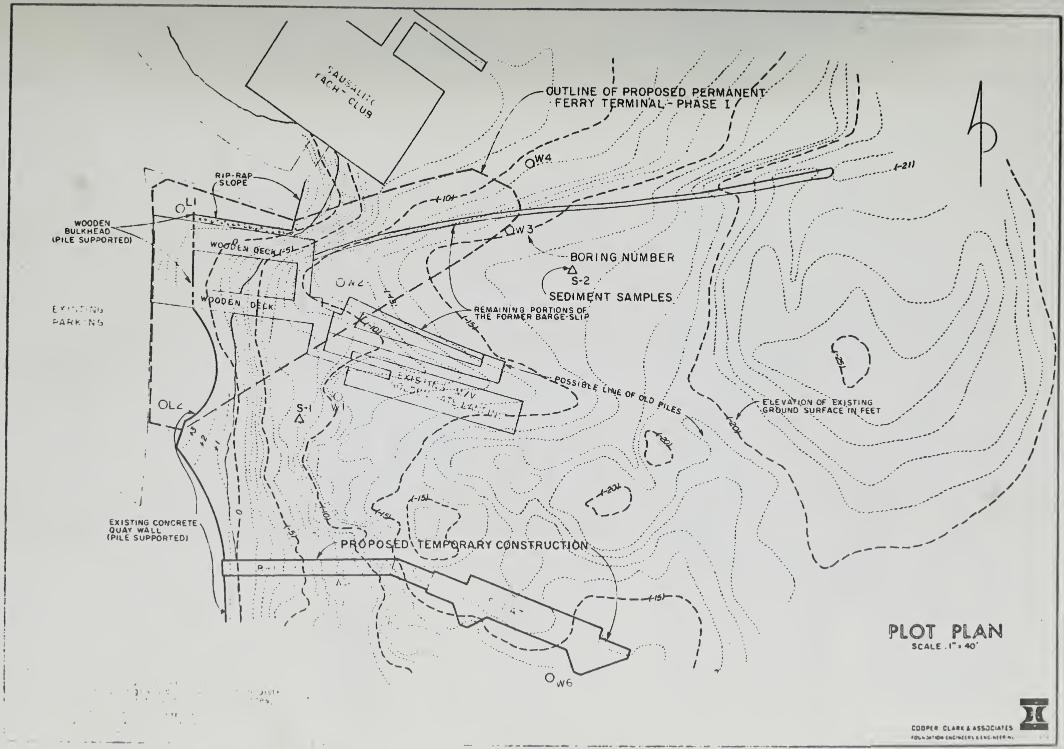
11. Schlocker, Julius, "Bedrock-Surface Map of the San Francisco North Quadrangle, California", U.S. Geological Survey, Open-File Map, 1961.

12. Schlocker, J., M.G. Bonilla, and D.H. Radbruch, "Geology of the San Francisco North Quadrangle, California", U.S. Geological Survey, Miscellaneous Geologic Investigation Map I-272, 1958.

13. "Seismicity Map of Greater San Francisco Bay Area, California 1969-1971", U.S. Geological Survey, Open-File Map, 1972.

14. Tocher, Don, "Seismic History of the San Francisco Region", California Division of Mines, Special Report 57, 1959.

15. Trask, P.D., and J.W. Rolston, "Engineering Geology of San Francisco Bay, California", *Geological Society of America Bulletin*, Vol. 62, 1951, pp. 1079-1110.


SAUSALITO YACHT CLUB
OUTLINE OF PROPOSED PERMANENT FERRY TERMINAL - PHASE I
W4
(-21)
RIP-RAP SLOPE
L1
(-10)
WOODEN BULKHEAD (PILE SUPPORTED)
WOODEN DECK (-5)
W3
BORING NUMBER
S-2
SEDIMENT SAMPLES
W2
(-15)
EXISTING PARKING
WOODEN DECK
REMAINING PORTIONS OF THE FORMER BARGE-SLIP
(-15)
EXISTING M/V GOLDEN GATE LANDING
POSSIBLE LINE OF OLD PILES
(-25)
L2
S-1
W1
ELEVATION OF EXISTING GROUND SURFACE IN FEET
(-20)
(-20)
+3
+2
+1
0
(-20)
(-15)
(-15)
(-5)
(-10)
EXISTING CONCRETE QUAY WALL (PILE SUPPORTED)
PROPOSED TEMPORARY CONSTRUCTION
(-15)
W6

PLOT PLAN

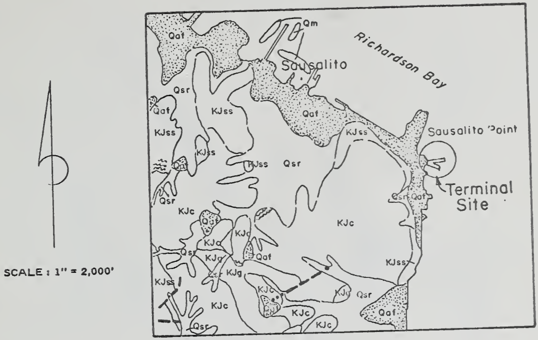
SCALE. 1" = 40'

COOPER CLARK & ASSOCIATES
FOUNDATION ENGINEERS & ENGINEERING

PLATE I-A

Revisions:
By______ Date______
By______ Date______
Location Sausalito, California

By FAS Date 6/11/74
Checked By J.O'R.
Job Number 1582-A2 Name Golden Gate Bridge



Qaf	Artificial fill, includes silt, clay, and rock rubble.
Qm	Bay mud, silty clay with some sand lenses.
Qsr	Slope debris and ravine fill, angular rock fragments in sand, silt and clay.
KJss | KJc | KJg	Franciscan Assemblage KJss – sandstone KJc – chert KJg – greenstone
———— — —	Lithological contact, dashed where approximately located.
━━ ━ ━ • • • • •	Fault, dashed where inferred; dotted where concealed.
≈≈	Shear Zone

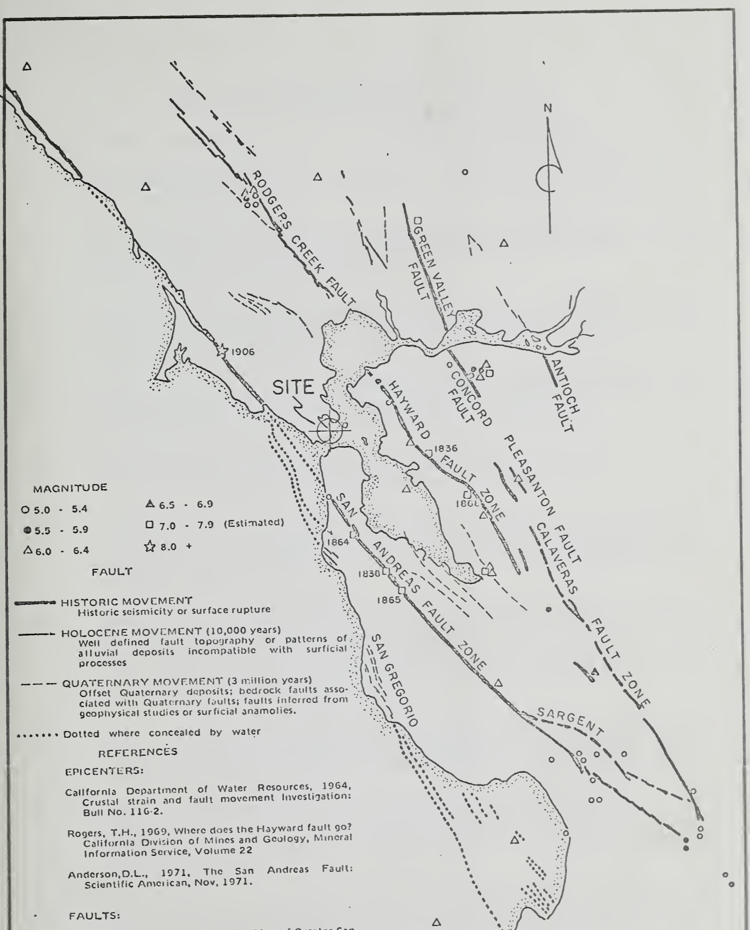
REGIONAL GEOLOGIC MAP

REF: Schlocker, J., M.G. Bonilla, and D.H. Radbruch, "Geology of the San Francisco North Quadrangle, California": U.S. Geological Survey, Miscellaneous Geologic Investigations Map I-272, 1958.

COOPER · CLARK & ASSOCIATES
FOUNDATION ENGINEERS & ENGINEERING GEOLOGIS

Revisions:
By ______ Date ______
By ______ Date ______

By NN Date 6/12/74
Checked By ______
Job Number 1582-A2 Name Golden Gate Bridge District Location Sausalito, California



MAGNITUDE

○ 5.0 - 5.4
● 5.5 - 5.9
△ 6.0 - 6.4
▲ 6.5 - 6.9
□ 7.0 - 7.9 (Estimated)
☆ 8.0 +

FAULT

HISTORIC MOVEMENT
Historic seismicity or surface rupture

HOLOCENE MOVEMENT (10,000 years)
Well defined fault topography or patterns of alluvial deposits incompatible with surficial processes

— — — QUATERNARY MOVEMENT (3 million years)
Offset Quaternary deposits; bedrock faults associated with Quaternary faults; faults inferred from geophysical studies or surficial anamolies.

.... Dotted where concealed by water

REFERENCES

EPICENTERS:

California Department of Water Resources, 1964, Crustal strain and fault movement investigation: Bull No. 116-2.

Rogers, T.H., 1969, Where does the Hayward fault go? California Division of Mines and Geology, Mineral Information Service, Volume 22

Anderson, D.L., 1971, The San Andreas Fault: Scientific American, Nov, 1971.

FAULTS:

Brown, R.D., Jr., 1972, Seismicity Map of Greater San Francisco Bay Area, California, 1969-1971: U.S. Geological Survey Open File Map.

Sarna-Wojcicki, A.M., 1972, Active faults in the San Francisco Bay Area: Progress report on the USGS Quaternary Studies in the San Francisco Bay Area, October 1972, P. 87-98.

EPICENTERS OF MAJOR HISTORICAL EARTHQUAKES AND ACTIVE, POTENTIALLY-ACTIVE FAULTS IN SAN FRANCISCO BAY AREA
(Time Covered 1836-1972)

Scale: 10 0 10 20 30 Miles

COOPER-CLARK & ASSOCIATES
FOUNDATION ENGINEERS & ENGINEERING GEO

PLATE A-3

By NN Date 6/12/74
Checked By
Job Number 1582-A2 Name Golden Gate Bridge District Location Sausalito, California
Revisions:
By Date
By Date

MODIFIED MERCALLI INTENSITY SCALE OF 1931

I. Not felt except by a very few under especially favorable circumstances.

II. Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.

III. Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration like passing of truck. Duration estimated.

IV. During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.

V. Felt by nearly everyone; many awakened. Some dishes, windows, etc.,broken; a few instances of cracked plaster; unstable objects overturned. Disturbance of trees, poles and other tall objects sometimes noticed. Pendulum clocks may stop.

VI. Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.

VII. Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.

VIII. Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Disturbs persons driving motor cars.

IX. Damage considerable in specially designed structures; well designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.

X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with their foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.

XI. Few, if any (masonry), structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipe lines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.

XII. Damage total. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into the air.

REF: Barosh, P.J., 1969, Use of seismic intensity data to predict the effects of earthquakes and underground nuclear explosions in various geologic settings: U.S. Geological Survey Bulletin 1279, p. 93.

APPENDIX E

TRANSPORTATION REPORT

by

Wilsey & Ham

CONTENTS

Page

3.5.0 EXISTING TRANSPORTATION ENVIRONMENT 1
3.5.1 Weekday Transport Conditions 2
3.5.1.1 Ferry Operations 4
3.5.1.2 Bus Transit 9
3.5.1.3 Walking 12
3.5.1.4 Other Modes 12
3.5.2 Weekend Transport Conditions 13
3.5.2.1 Ferry Operations 15
3.5.2.2 Bus Transit 19
3.5.2.3 Walking 19
3.5.2.4 Other Modes 24

5.5.0 IMPACT ON THE TRANSPORTATION ENVIRONMENT 26
5.5.1 Impact on Local Transport Systems 26
5.5.1.1 Weekday Transport Conditions 27
Case I Existing System 29
Case II Proposed System at Capacity of Spaulding 165 31
Case III Existing System with Increased Demand 34
5.5.1.2 Weekend Transport Conditions 38
Case I Existing System with Increased Demand 41
Case II Proposed System at Capacity of Spaulding 165 43
Case III Existing System with Increased Demand 43
5.5.2 Relationship Between the Proposed Ferry Terminal System and Other Environmental Changes 46
5.5.3 Implications of the Proposed Ferry Terminal System Upon the Larger Transport Environment 49
5.5.3.1 County Transport Implications 49
5.5.3.2 Regional Transport Implications 51

The report on transportation systems is divided into two major sections: the existing transportation environment and the impacts of the proposed ferry terminal upon this environment.

3.5.0 EXISTING TRANSPORTATION ENVIRONMENT

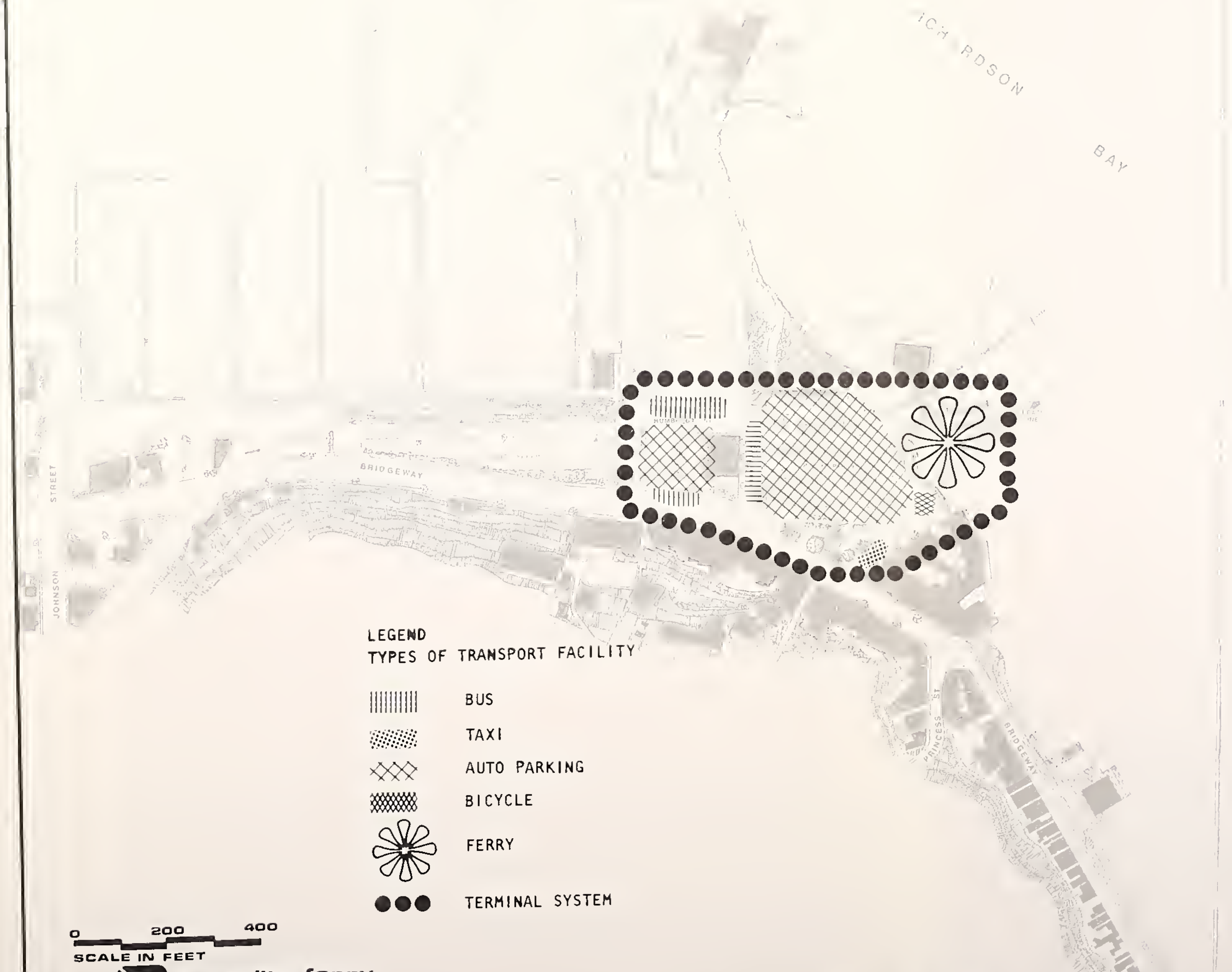
This section discusses the system of transport modes operating in conjunction with the ferry terminal located in downtown Sausalito. The characteristics of the major transport systems are reviewed in terms of weekday and weekend peak periods during which local traffic(1) flows are considered to be the heaviest.

The function of the Sausalito Ferry Terminal, subsequently referred to as "the terminal", is to allow for the conduct of ferry operations between Sausalito and San Francisco. The proximity of the terminal to intensive commercial activities and other complementary transport systems creates a unique traffic environment in the downtown area. The terminal is only one element of the downtown terminal complex where several transport modes converge: ferries, automobiles, buses, bicycles, taxi, and walking. Modal transfer occurs on the land side of the terminal vicinity where ferry passengers can either be delivered or picked up by various modes of transport (Figure 1).

At the present time, both local and regional transportation facilities relating directly or indirectly to the operations of the terminal are most heavily used at certain weekday periods, and because of the

---

(1) Unless otherwise specified, the term "traffic" denotes both pedestrian and vehicular traffic.



NORTH

sausalito ferry terminal EIR
PREPARED BY:
Wilsey & Ham

DOWNTOWN TERMINAL SYSTEM

FIGURE 1

visitor-oriented nature of downtown Sausalito, traffic demand on the weekends is also heavy.

3.5.1 Weekday Transport Conditions (Monday through Friday)

Generally, local transport facilities directly related to the terminal are heavily utilized between the hours of 4:00 and 6:00 P.M.(2). Bridgeway, with a 2-lane, 2-way section in downtown Sausalito(3), is the only roadway which provides a direct traffic connection between North and South Sausalito.

Traffic flow on downtown Bridgeway is regulated by three traffic signals located at Johnson, Bay, and Princess Streets. Signals at Johnson and Princess Streets are traffic-actuated while the one at Bay Street is a pretimed device. The operation of the traffic-actuated signal is varied in accordance with the demands of traffic as registered by the actuation of vehicle or pedestrian detectors on one or more approaches. The pretimed signal directs traffic in accordance with a single predetermined sequence of signal indications.

Due to the topographic constraints which limit the location and alignment of local street network and the intensive commercial development

---

(2) Based upon existing traffic counts from the Sausalito Department of Public Works.

(3) Generally denotes the waterfront area within 2,000 feet of the existing ferry terminal.

which has occurred in downtown areas, Bridgeway is being used by both the local and intercity vehicular traffic throughout the day. In September 1972, 1,324 vehicles were recorded, by the Marin County Department of Public Works, on Bridgeway east of Johnson Street from 4 to 5 p.m. Assuming a 50-50 directional split in vehicular traffic volumes, 662 vehicles would have used this segment of Bridgeway in each direction in the p.m. peak hour. Such an assumption is very similar to the 650 southbound vehicles recorded by Sausalito Department of Public Works at 5 to 6 p.m. Friday, March 31, 1972. Wilbur Smith and Associates conducted speed and travel time runs on Bridgeway in June 1973. The result of that survey shows the Friday peak hour vehicular traffic speed between Princess and Bay was less than 10 miles per hour (Environmental Impact Planning Corporation, 1974)(4). Vehicular traffic speeds north of Napa Street were acceptable for an urban arterial but there was considerable congestion south of Napa Street. The above data, together with the historical increase in traffic, suggested that downtown Bridgeway is, at best, operating near capacity during the summer p.m. peak hours. Here the term "capacity" is identical to "possible capacity" which is defined as the maximum number of vehicles that can be accommodated under prevailing roadway and traffic conditions regardless of the effect of delaying drivers and restricting their freedom to maneuver (Federal Highway Administration, 1971). This condition also represents a level of service "E".

---

(4) See Bibliography Section for all references in this report.

Level of Service is a term which, broadly interpreted, denotes any one of an infinite number of differing combinations of operating conditions that may occur on a given lane or roadway when it is accommodating various traffic volumes. The Highway Capacity Manual defines 6 levels of service, A through F, with Level A representing uninterrupted flow and Level F representing totally congested flow (National Academy of Sciences, 1965). See Tables 1 and 2 for level of service definitions.

3.5.1.1 Ferry Operations

Table 3 shows the present weekday ferry schedule. At present, the M.V. Golden Gate makes 11 round trips (22 operations) between San Francisco and Sausalito. Of this total, only 3 operations are scheduled during the p.m. peak periods -- 2 arrivals at 4:40 and 6 p.m. and one departure at 4:45 p.m.

In terms of ferry patronage, the 1974 Bridge District statistics indicate that a total of 583 persons used the ferry at the peak period. The relatively high ferry patronage at these times of the day corresponds with that of the bus and auto volumes in downtown Sausalito. Table 4 compares the most recent peak hour patronage with that of the summer months. The higher level of patronage in August can be attributed to the general increase in off-peak ferry traffic at that time of the year.

TABLE 1

LEVEL OF SERVICE DEFINITIONS:

A - No vehicle waits longer than one red indication (Free Flow).

B - An occasional approach phase is fully utilized (Stable Flow).

C - Occasionally drivers may have to wait for more than one red indication: backups may develop behind turning vehicles (Stable Flow). Less than 30% of the vehicles are delayed by no more than one signal cycle length. This level of service is typically associated with urban design practice, and should accommodate 1,500 vehicles per hour (vph) per lane of traffic on the open road, with an intersection "service volume" of 1,250 vehicles per hour per lane per hour of green and a "load factor" per cycle of 0.1 - 0.3. Average speed 20-25 mph.

D - Delays may be substantial during short periods but enough cycles with lower demand occur to permit clearance (Approaching Unstable Flow). Should accommodate 1,800 vph per lane of traffic on the open road, with an intersection "service volume" of 1,400 vehicles per hour per lane per hour of green and a "load factor" per cycle of 0.3 - 0.7. Average speed 15-20 mph.

E - There may be long queues of vehicles waiting up to several red indications (Unstable Flow). This level represents "capacity" conditions, with a "service volume" of 1,500 vehicles per hour per lane per lane of green and a "load factor per cycle of 0.7 - 0.1." Average speed about 15 mph.

F - Jammed conditions: flow unpredictable. Police traffic direction may be needed (Forced Flow).

Source: Highway Research Board, 1965, pp. 116, 129-131, 139, 323.

The level of service is also described in Table 2.

TABLE 2

LEVELS OF SERVICE FOR DOWNTOWN STREETS

Level of Service	Traffic Flow Conditions (Approximations, not rigid criteria)	Average Overall Speed (Miles Per Hour)
A	Free flow (relatively; some stops will occur)	25
B	Stable flow (delays not unreasonable)	20
C	Stable flow (delays significant but acceptable)	15
D	Approaching unstable flow (delays tolerable)	10
E*	Unstable flow (congestion not due to back-ups ahead)	Below 10 but moving
F	Forced flow (jammed)	Stop-and-go

*Level E for the downtown street as a whole cannot be considered as capacity; capacity is governed by that of controlling intersections or other interruptions.

Source: Table 10.14, Highway Capacity Manual, Highway Research Board, 1965.

TABLE 3

WEEKDAY SAUSALITO FERRY SCHEDULE

SAUSALITO Departure	SAN FRANCISCO Arrival	SAN FRANCISCO Departure	SAUSALITO Arrival
7:15	7:45	7:50	8:20
8:25	8:55	9:05	9:35
9:45	10:15	10:25	10:55
A.M. 11:05	11:35	11:45	12:15
P.M. 12:25	12:55	1:10	1:40
2:00	2:30	2:45	3:15
3:25	3:55	4:10	4:40
4:45	5:15	5:30	6:00
6:10	6:40	6:50	7:20
7:30	8:00	8:10	8:40
8:50	9:20	9:25	9:55

Source: Golden Gate Bridge, Highway and Transportation District. Effective December, 1973.

TABLE 4

EXISTING WEEKDAY FERRY PATRONAGE

ARRIVAL

Date	Time	Avg. Number*	Percent of Daily Total
February 1974	4:40 p.m.	124	11.5
	6:00 p.m.	293	27.2
	Daily	1,079	100.0
August 1973	4:40 p.m.	286	13.7
	6:00 p.m.	377	18.0
	Daily	2,094	100.0

DEPARTURE

Date	Time	Avg. Number*	Percent of Daily Total
February 1974	4:45 p.m.	156	16.1
	Daily	970	100.0
August 1973	4:45 p.m.	383	18.5
	Daily	2,066	100.0

*Friday averages.

Source: Monthly Statistical Summary, Planning and Research Section, Golden Gate Bridge, Highway and Transportation District, 1973 and 1974.

The following sections discuss the various access modes relating to the terminal operations(5). The discussion is primarily focused upon the transportation of peak hour ferry passengers, many of whom are commuters whose usage of the service is basically determined by their working hours. Of all the ferry operations during the p.m. peak period, the 6 p.m. arrival carries the largest number of passengers from San Francisco to Sausalito.

Three major types of terminal access(6) for peak hour ferry passengers can be analyzed: bus transit, walking, and others. The access pattern is closely related to the circulation in downtown as depicted in Figure 2.

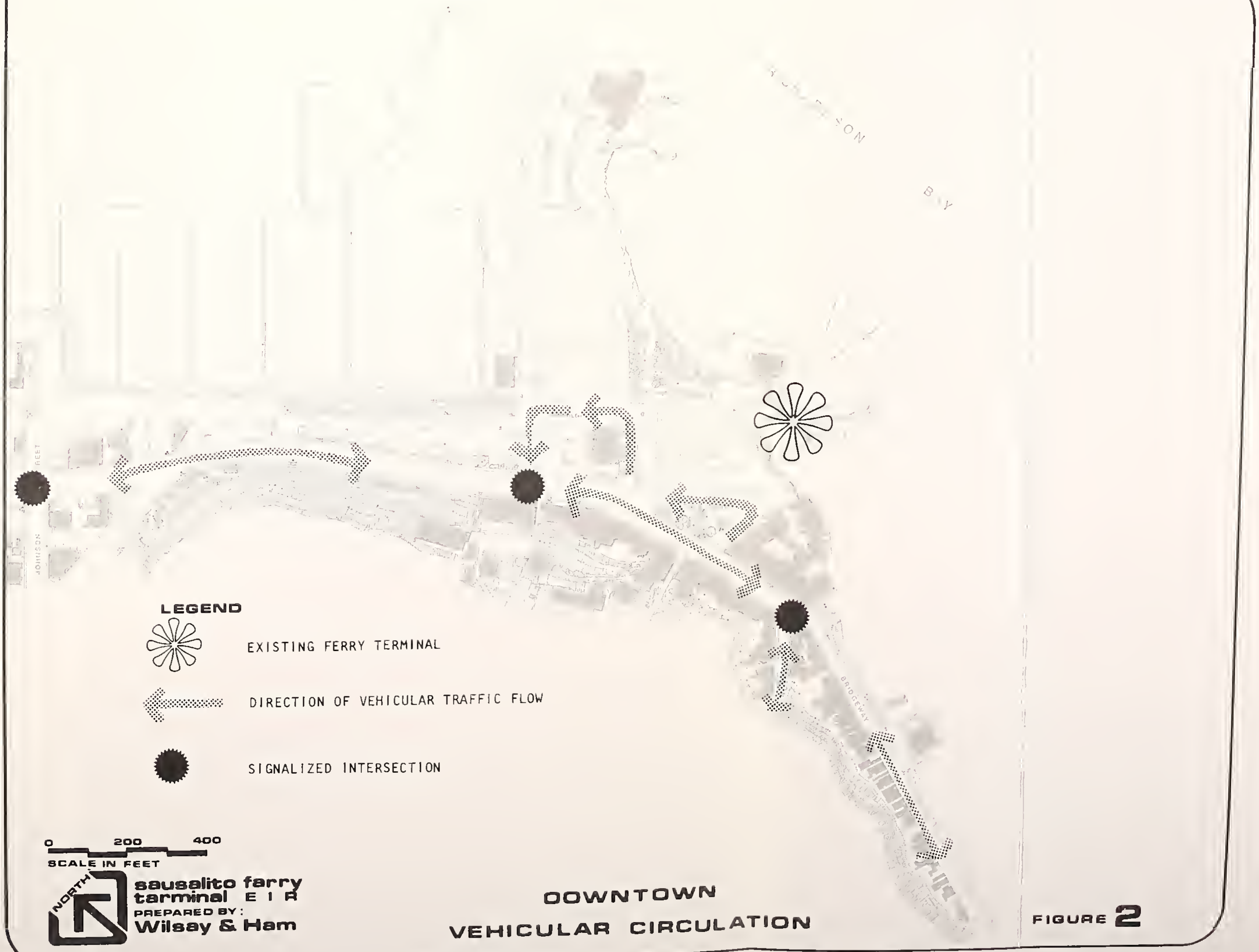
3.5.1.2 Bus Transit

Peak period ferry operations are served by public transit provided by the Golden Gate Bridge Highway and Transportation District. Two types of transit services operating in conjunction with the ferry system are available: feeder and line-haul systems.

The feeder transit system provides a direct connection between the ferry terminal and several Marin County communities. This system also serves South Sausalito and the ferry parking lot in Marinship, where free parking is available to those who use automobiles as a part of their terminal access.

(5) An operation is either a departure or arrival.

(6) Ways and means of getting to and from the ferry terminal.



DOWNTOWN VEHICULAR CIRCULATION

FIGURE 2

The line-haul transit system's main function is to provide service between San Francisco and cities in Marin and Sonoma Counties. The line-haul system making stops in Sausalito can be used by ferry patrons for terminal access, as well as by bus patrons who do not use the ferry.

Table 5 shows the number and type of bus operations having stops in downtown Sausalito. Line-haul operations make up about three-fourths of total operations at the peak period. In the case of feeder service, the same vehicle is used for terminal inbound and outbound operations. Normally, about half of all ferry patrons use the feeder system for terminal access during the peak hours. (Golden Gate Bridge Highway and Transportation District, 1972).

The 6 p.m. ferry run is served by five feeder buses which reach the terminal area several minutes prior to ferry arrival or departure. These vehicles only stay long enough to complete the loading/unloading of passengers. With the exception of the south Sausalito feeder service, all terminal inbound transit vehicles travel south on Bridgeway and turn left at Anchor Street where two public transit curb parking spaces are provided. Four more curb parking spaces on Humboldt Street can be used by private and public transit buses.

TABLE 5

WEEKDAY PUBLIC TRANSIT SERVICE WITH STOPS IN DOWNTOWN SAUSALITO (4:00 P.M.-6:00 P.M.)

ROUTE NUMBER	DIRECTION OF TRAVEL				TYPE OF OPERATION
	Northbound		Southbound		
	4 - 5 P.M.	5 - 6 P.M.	4 - 5 P.M.	5 - 6 P.M.	
2	1	4	0	0	Line-haul
4	3	2	2	2	Line-haul
5	2	0	3	1	Line-haul
7	2	4(a)	2	3(b)	Ferry Terminal Feeder(c)
8	0	4	0	0	Line-haul
20	2	2	2	2	Line-haul
62	0	2	0	0	Line-haul
Total	10	18	9	8	

(a)All vehicles leave the ferry terminal at 6:05 p.m.

(b)One vehicle leaves the ferry terminal at 6:05 p.m.

(c)Including arrivals and departures.

Source: Golden Gate Bridge, Highway and Transportation District, March 1974.

Terminal outbound buses traveling on the one-way loop of Anchor-Humboldt Streets exit on Bay at Bridgeway where a fixed time traffic signal is provided.

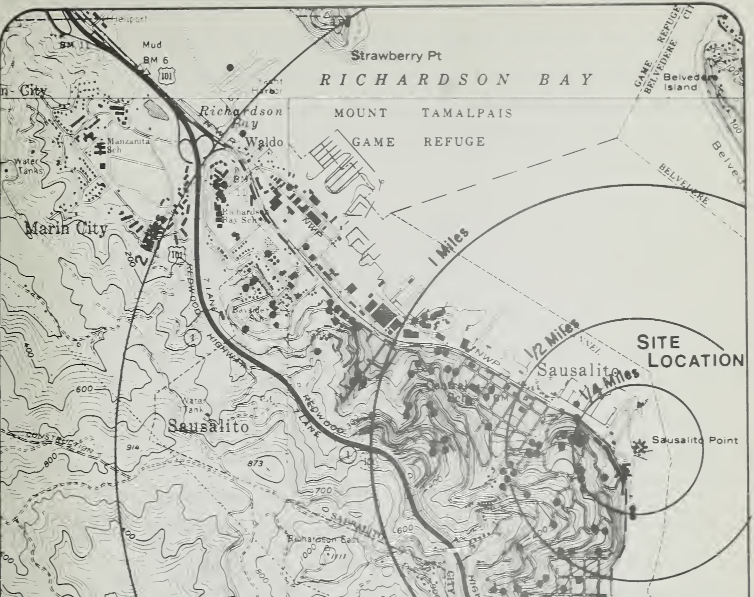
3.5.1.3 Walking

Walking as an access mode is used by about one-third of ferry passengers at the peak period. Those selecting this mode are Sausalito residents living within walking distance of the terminal. Figure 3 shows the residential location of peak hour ferry riders. Spreading throughout the City, the straightline distance between the home and the terminal vary from several hundred feet to 2 miles. (Golden Gate Bridge, Highway and Transportation District 1972)

A passenger survey aboard the M.V. Golden Gate found that more than half of all ferry patrons living in Sausalito walk to the terminal. (Golden Gate Bridge, Highway and Transportation District, 1972) The median walking distance (approximately 0.4 straightline miles) was greater than would be expected from standard transit experience (0.25 miles). The survey also found that about 98 percent of those walking lived within one mile of the terminal.

3.5.1.4 Other Modes

Automobile, bicycle, and taxicab are alternative terminal access modes currently used by about 15 percent of ferry passengers at the peak period. Bicycle users enjoy the most direct access to



sausalito ferry terminal E I R
PREPARED BY:
Wilsey & Ham

SAUSALITO FERRY COMMUTER RESIDENCES

LEGEND

- ● ONE COMMUTER AS INDICATED

FIGURE 3

SOURCE: PASSENGER SURVEY ABOARD M.V. GOLDEN GATE.
GGBHTD 10/24/72

and from the terminal as bicycle storage facilities are located near the ferry boarding area in the city parking lot No. 1, shown on Figure 2. In many instances, patrons bring their bicycles aboard and use them at both ends of their ferry trips.

Auto access to the terminal is primarily in the form of pick-up and drop-off, generally occurring at the nearest parking lot or on Park Street. Major auto traffic movements associated with the ferry operations consist of terminal inbound vehicles on Bridgeway turning left at Anchor and El Portal Streets, interferring with through-traffic on Bridgeway. The conflict at Anchor Street is less noticeable as a left-turn lane is available at this location. Terminal inbound vehicles from the south could make free right-turns at Anchor and El Portal Streets. Inbound vehicles from both directions of Bridgeway could interfere with pedestrians or bicyclists crossing Anchor and El Portal. All outbound vehicles exit the Bay and Bridgeway intersection by making either a right- or left-turn. Such movements tend to conflict with pedestrians crossing Bridgeway.

3.5.2 Weekend Transport Conditions (Saturdays, Sundays, and Holidays)

A different kind of local transport condition occurs on weekends. Because of recreational attraction to Sausalito, a heavier transportation demand is placed upon Bridgeway in general and the downtown area in particular. Although vehicular traffic volumes on Bridgeway vary according to weather, activities in Marin, etc., a highly congested flow (stop-and-go operations) can often be observed

on downtown Bridgeway. Vehicular traffic congestion extends north to Napa Street and south to Richardson Street, and beyond. Such phenomena usually occur from noon to 7 p.m. In 1972, the average weekend peak hour vehicular traffic volume on Bridgeway was about 650 vehicles southbound at Johnson Street and 500 northbound at Princess Street (Sausalito, 1972). These volumes generally represent the present capacity of these signalized intersections.

Wilbur Smith and Associates conducted speed and travel time runs on Bridgeway in June 1973. The survey indicates these vehicular traffic conditions on Sunday peak hours: "North of Napa Street, Bridgeway is developed to full standards for an urban arterial and provides excellent operation. Travel speeds on this portion of the street range between 24 and 30 miles per hour. South of Napa Street, Bridgeway is considerably more congested. Southbound vehicular traffic speed is as low as 3 miles per hour between Bay and Johnson Streets." (Environmental Impact Planning Corporation, 1973, Appendix C, p. 11).

Although downtown Bridgeway is generally considered to be a congested arterial during peak hours, that portion of the roadway between Princess and Bay tends to operate more efficiently. There seem to be two reasons for this: first, the higher vehicular traffic volume which can be accommodated by Bridgeway south of Princess and north of Bay is being regulated and reduced by the traffic signals at Princess and Bay; secondly, once getting through these bottleneck intersections, vehicular traffic is somewhat dispersed on several roadways including Anchor, Humboldt, and Bay Streets.

3.5.2.1 Ferry Operations

On weekends, the M.V. Golden Gate currently makes eight round-trip operations per day, three less than that of the weekdays (Table 6). The ferry maintains a 90-minute headway. As a result of a significant increase in visitor trips, weekend operations generally have a higher daily patronage.

Average Sunday ferry passenger volumes are shown in Table 7. A higher level of demand occurs throughout the afternoon hours. The ferry system, while delivering many persons to Sausalito, also brings a large number back to San Francisco on each return trip. The existing usage of ferry service results in the largest number of patrons in Sausalito between the hours of 1 and 4 p.m. During this period, the number of ferry riders per run is approximately equal to the total accumulated in Sausalito. For the purpose of simplicity and clarity, the following discussion will consider a peak hour period between 1 and 2 p.m.

Table 8 shows the number of ferry patrons per arrival/departure at the peak hour in February and August. It indicates a small seasonal variation in weekend patronage. This contrasts with the weekday operations where the summer monthly patronage usually was twice that of the non-summer months.

TABLE 6

WEEKEND SAUSALITO FERRY SCHEDULE
(SATURDAYS, SUNDAYS, AND HOLIDAYS*)

SAUSALITO DEPARTURE	SAN FRANCISCO ARRIVAL	SAN FRANCISCO DEPARTURE	SAUSALITO ARRIVAL
9:45 a.m.	10:15 a.m.	10:25 a.m.	10:55 a.m.
11:05	11:35	11:45	12:15 p.m.
12:30 p.m.	1:00 p.m.	1:15 p.m.	1:45
2:00	2:30	2:45	3:15
3:30	4:00	4:15	4:45
5:00	5:30	5:45	6:15
6:25	6:55	7:05	7:35
7:45	8:15	8:20	8:50

* New Year's, Washington's, Memorial, Independence, Labor, Veterans', Thanksgiving and Christmas Days

TABLE 7

EXISTING WEEKEND FERRY PATRONAGE

ARRIVAL

Date	Time	Average Number*	Percent of Daily Total
February 1974	1:45 p.m.	541	23.3
	Daily	2,318	100.0
August 1973	1:45 p.m.	565	22.0
	Daily	2,563	100.0

DEPARTURE

Date	Time	Average Number*	Percent of Daily Total
February 1974	2 p.m.	394	16.8
	Daily	2,351	100.0
August 1973	2 p.m.	432	16.8
	Daly	2,570	100.0

* Sunday Averages

Source: Monthly Statistical Summary, Planning and Research Section, Golden Gate Bridge, Highway and Transportation District, 1973 and 1974.

TABLE 8

AVERAGE SUNDAY FERRY PASSENGER TRAFFIC IN SAUSALITO-AUGUST 1973

Time Period	In	Out	Difference	Total Accumulated
10:25 - 11:45	257	81	176	176
11:45 - 1:10	465	192	273	449
1:10 - 2:45	565	432	133	582
2:45 - 4:10	572	573	(1)	581
4:10 - 5:30	434	575	(141)	440
5:30 - 6:50	174	472	(298)	142
6:50 - 8:10	73	225	(152)	(10)

( ) More departing than arriving passengers.

Source: Monthly Statistical Summary, Planning and Research Section, Golden Gate Bridge, Highway and Transportation District, 1973.

3.5.2.2 Bus Transit

Both private and public transit systems provide services to the vicinity of the ferry terminal. At present, several curb parking spaces on Humboldt Street are designated for private transit usage. Private transit operations are primarily conducted by sightseeing companies and schools. Private transit vehicles either pass through or make a short stop at the City and are not coordinated with the ferry operations. Useful information on private transit operations is not available.

Weekend transit operations, provided by the Golden Gate Bridge, Highway and Transportation District, are reduced due to a smaller demand for such services. Like weekdays, both feeder and line-haul services are available. Table 9 shows the District's transit services between 1 and 2 p.m. Note that the number of public transit vehicles traveling in the southbound and northbound directions on Bridgeway are equal. On weekends, only one feeder bus is scheduled with each ferry operation.

3.5.2.3 Walking

The nature and intensity of development in downtown Sausalito, coupling with a large number of ferry passengers who are visitors, make walking the most significant mode of ferry terminal access. Pedestrian ferry passengers, together with those using other modes, cause a major change in the circulation conditions of downtown Sausalito.

TABLE 9

WEEKEND PUBLIC TRANSIT SERVICE WITH STOPS IN DOWNTOWN SAUSALITO BETWEEN 1:00 AND 2:00 P.M.

ROUTE NUMBER	DIRECTION OF TRAVEL		TYPE OF OPERATION
	Northbound	Southbound	
7	1	1	Ferry Terminal Feeder
10	1	1	Line-haul
20	2	2	Line-haul
Total	4	4	

Source: Golden Gate Bridge, Highway and Transportation District, March, 1974.

The volume of pedestrian traffic in Sausalito is determined to a large degree by weather conditions, time of the year, and special events. In general, pedestrian traffic increase is closely associated with vehicular traffic increase, as many pedestrians arrive by cars. With the exception of the fixed time traffic signal by which a given amount of time is allocated to each mode of transport, other control devices, such as stop signs or traffic-activated signals, tend to create more movement conflicts as pedestrians and vehicles compete for circulation spaces. At a time when pedestrian volumes are low, traffic signals can be designed to maximize vehicular flow. If the total traffic volume (pedestrian and vehicular) exceeds the capacity of the intersection at a certain level of service, then trade-offs in circulation performance among various modes must be made.

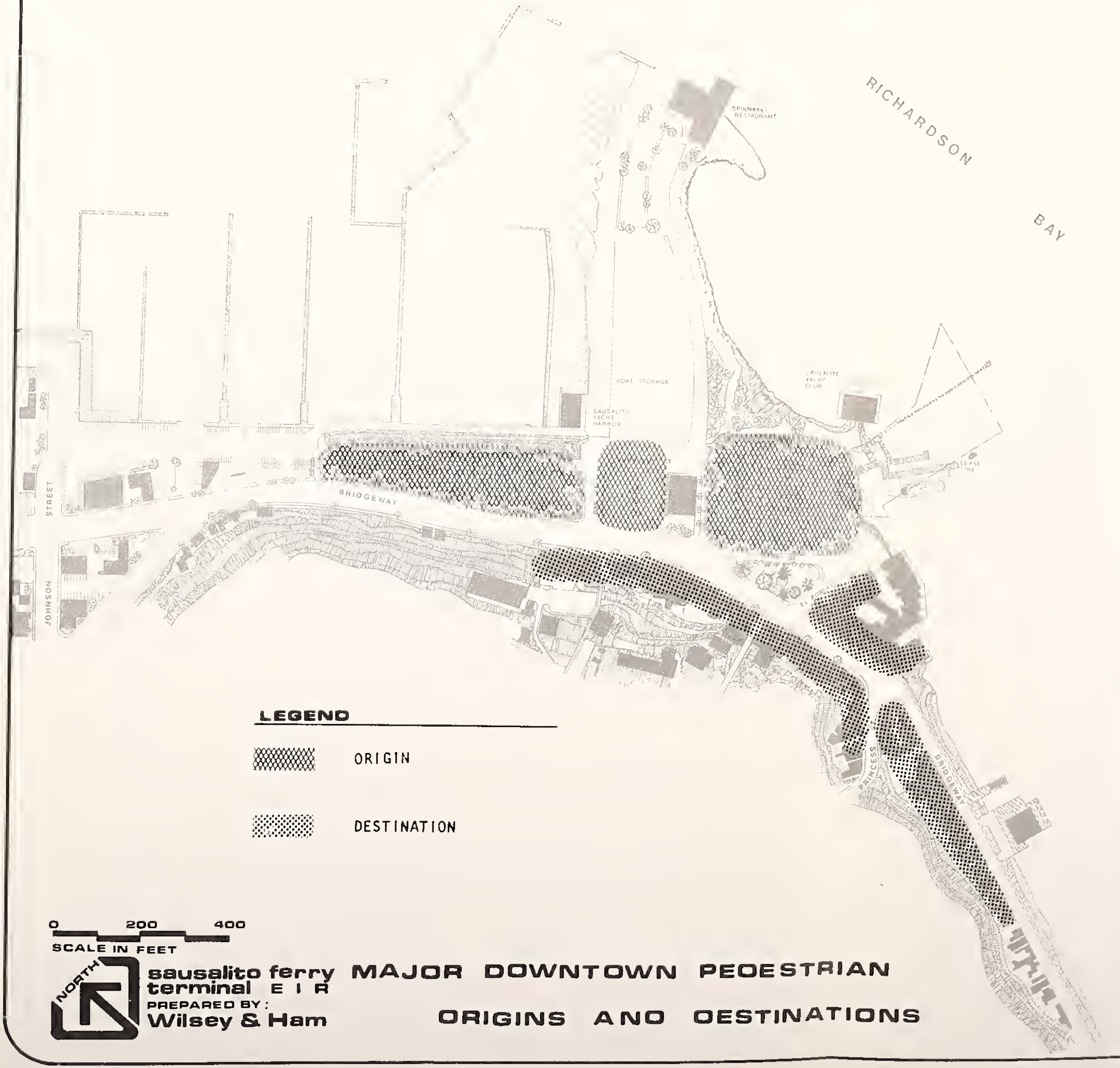
The nature, magnitude, and distribution of major pedestrian activities in "downtown Sausalito" can be discussed in the following terms:

1. Origin-Destination. The origins of pedestrian trips in downtown Sausalito are determined by their modes of arrival. Since the downtown is not accessible by walking to all people living outside Sausalito, other modes of transport must be employed. This requirement, together with the availability of terminal facilities, makes downtown the major origin of pedestrian trips.

The destinations of the downtown pedestrian are related to the acceptable walking distance. Normally they include all the downtown activities which are located near the ferry terminal. Figure 4 depicts the major origin-destinations of pedestrians. This figure does not show the origin of the resident pedestrians which are located throughout the city. Here the proximity of the pedestrian origin and destination is primarily caused by the presence visitor attractions (commercial activities) and modal transfer facilities in the downtown area.

2. Pedestrian Facilities and Circulation Linkages. Facilities designed for pedestrians include corridors, steps, sidewalks, and footpaths. Sidewalks account for most of the designated pedestrian facilities and are situated throughout the downtown (Figure 5). Facilities not designated, but in many cases also used by pedestrians, are off-street parking lots and vehicular rights-of-way. Pedestrian linkages are provided by crosswalks located and marked at all intersections along downtown Bridgeway. Other downtown streets adjacent to the terminal have no crosswalk marking for pedesqrian movements.

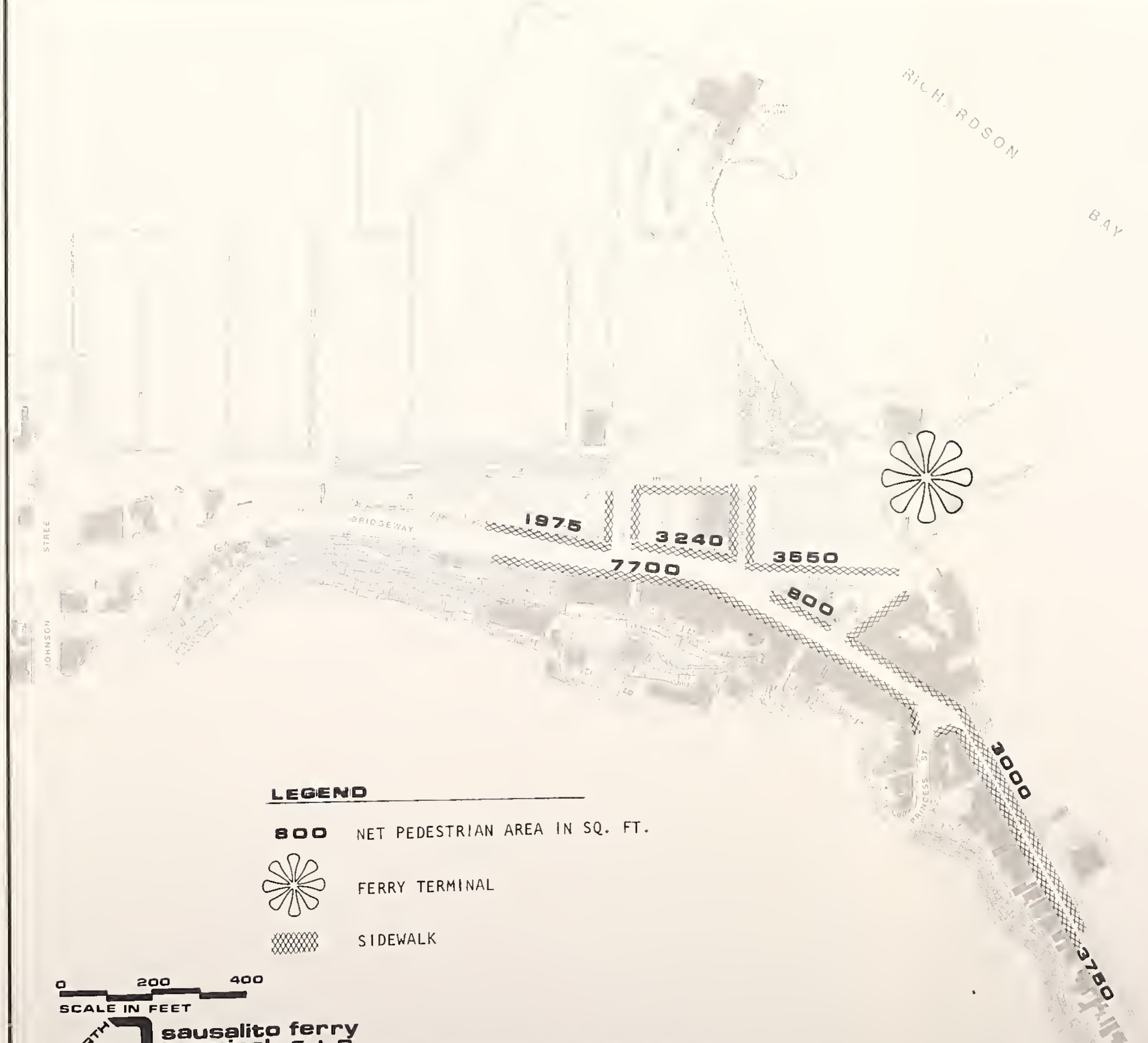
   Pedestrian movements on Bridgeway are controlled at two signalized intersections (Princess Street and Bay Street), with special crosswalk indicators operated in conjunction with vehicular traffic signals. Four other pedestrian crosswalks on Bridgeway are



sausalito ferry terminal E I R
PREPARED BY:
Wilsey & Ham

MAJOR DOWNTOWN PEDESTRIAN ORIGINS AND DESTINATIONS

FIGURE 4



NORTH

sausalito ferry terminal EIR
PREPARED BY:
Wilsey & Ham

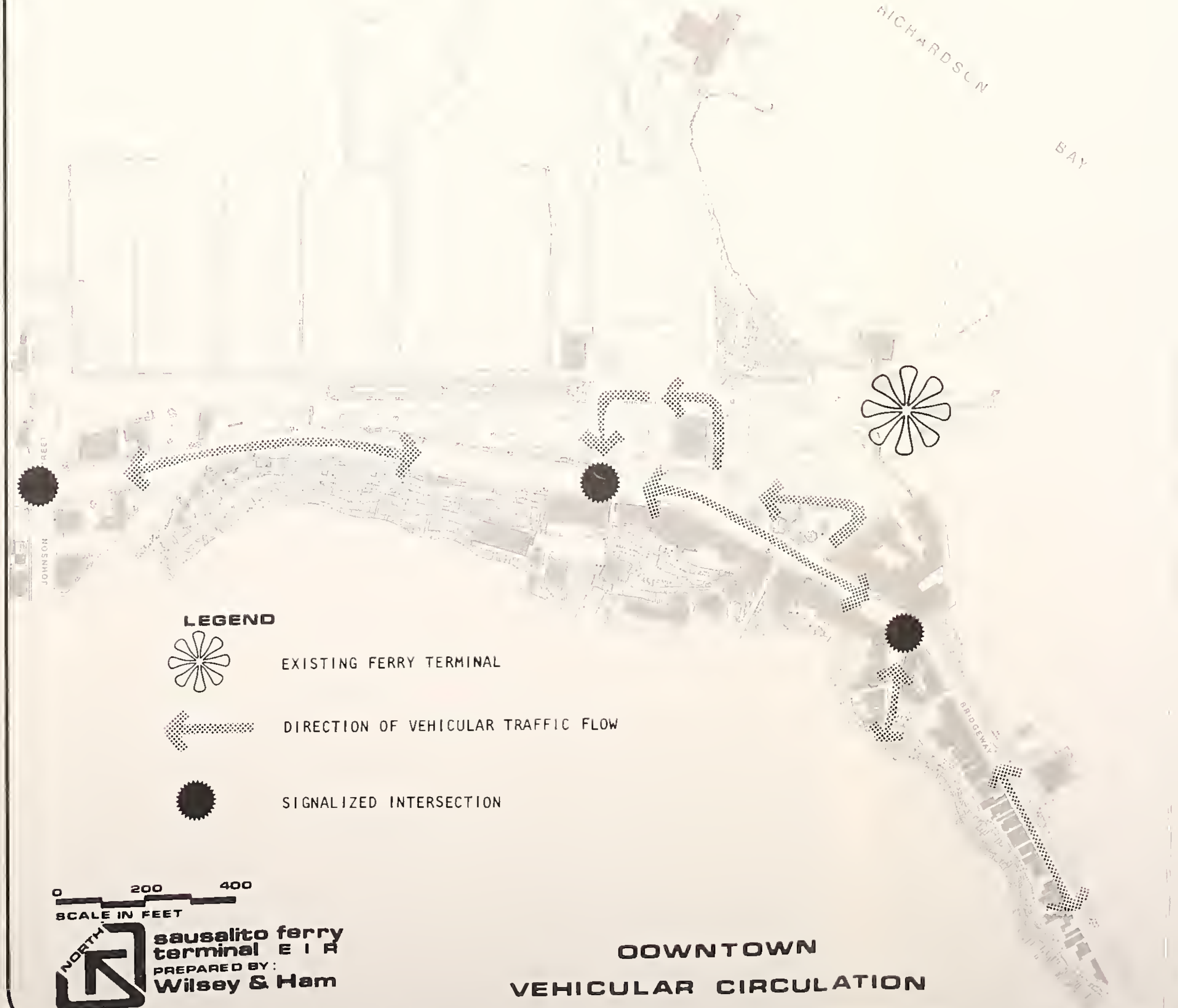
DOWNTOWN PEDESTRIAN CIRCULATION FACILITY

FIGURE 5

uncontrolled and provide a point of conflict between pedestrian and vehicular movements.

3. Pedestrian Circulation Patterns. Downtown pedestrian flow generally assumes a linear configuration along Bridgeway where most activities are located. However, immediately before and after each ferry arrival, two intense pedestrian corridors are developed to the west and south of the terminal. (Figure 6). These corridors, created by arriving and departing ferry patrons, and extending through Parking Lot #1, Park, and El Portal Streets, conflict with vehicular traffic movements.

Most downtown commercial facilities are located on the west side of Bridgeway between Bay and Princess Streets. Those on the opposite side are situated between El Portal and Princess Streets. Sidewalks bordering these facilities record the highest volume of pedestrian traffic. At peak pedestrian periods, a large number of persons have their normal walking speeds reduced due to difficulties in bypassing slower-moving pedestrians and avoiding conflicts. Pedestrians involved in reverse-flow and crossing movements are restricted with the occurrence of multiple conflicts with others.



sausalito ferry terminal EIR
PREPARED BY:
Wilsey & Ham

DOWNTOWN VEHICULAR CIRCULATION

FIGURE 6

Pedestrian traffic is also heavy on other segments of downtown Bridgeway where there is no commercial development. Possible causes for such a condition include: (1) Pedestrians on recreational and shopping trips prefer to select a different route for each part of their journeys; (2) Pedestrian sightseers tend to avoid heavy traffic volumes on sidewalks bordering commercial facilities; (3) many walkways on the east side of Bridgeway afford a better or unobstructed view of the Bay; and (4) those who use the ferry or the off-street parking lots may choose to use the east side of Bridgeway on their return trips. Consequently, heavy pedestrian flow occurs throughout the downtown section of Bridgeway.

3.5.2.4 Other Modes

Auto, taxi, and bicycle are other transport modes used in conjunction with the operation of the ferry terminal. On weekends when commuter travel to and from San Francisco is mostly eliminated, ferry patrons are made up largely of visitors destined for downtown Sausalito - an activity area within walking distance of the terminal, making the utilization of autos or taxicabs unnecessary. Consequently, vehicular traffic on the El Portal-Park and the Anchor-Humboldt Bay one-way loops are not significantly affected by vehicles associated with the terminal access.

A number of ferry patrons from San Francisco bring bicycles to Sausalito. This causes certain inconvenience to the pedestrians, as it increases the potentials for modal conflict. However, these cyclists generally anticipate longer trips and therefore spend less time in downtown than ferry pedestrians. In April 1974, all planter boxes placed near the curb of Bridgeway were removed and a bicycle lane provided. The significance of such an improvement on traffic circulation may not be known for some time. However, it has reduced the amount of pedestrian circulation spaces which, in certain locations are needed.

5.5.0 IMPACT ON THE TRANSPORTATION ENVIRONMENT

Transportation impact can be broken down into three areas of major concern:

1. The impact of the proposed ferry terminal system upon the local transport systems during the weekday and weekend peak periods;

2. The relationships between the proposed ferry terminal system and emerging environmental changes; and

3. The implications of the proposed ferry terminal system upon the larger transport environment.

5.5.1 Impact on Local Transport Systems

The most direct and obvious impact the proposed ferry terminal system (the physical improvements and ferry operations) would generate will be on the land transport environment in downtown Sausalito. Several assumptions are used in the impact analysis:

1. Environmental setting exists as described in previous sections of this report;

2. The proposed ferry terminal system will be in operation by spring 1976;

3. No changes in Sausalito's land use and highway network are

anticipated; and

4. The Bridge District's Larkspur Ferry Terminal will be in operation.

5.5.1.1 Weekday Transport Conditions (Monday through Friday)

In early 1976 when the proposed Sausalito terminal system is projected to be in operation, the number of ferry runs between San Francisco and Sausalito would be modified to meet anticipated demand for services. A proposed weekday Sausalito ferry schedule has been developed by the Bridge District (Table 10). It calls for the operation of two ferries, one of which could be the M.V. Golden Gate, at the maximum service period (10:00 a.m. to 4:00 p.m.). The rest of the time only one ferry would operate and then on the present schedule. The expanded service changes the number of operations (departures and arrivals) in Sausalito from 22 to 30, an increase of 36 percent.

The proposed schedule will boost the passenger handling capacity of the ferry system. Three operational alternatives can be envisioned:

Alternative I	Most runs made by M.V. Golden Gate, supplementary runs by Spaulding 165.
Alternative II	Most runs made by Spaulding 165, supplementary runs by M.V. Golden Gate; and

TABLE 10

PROPOSED WEEKDAY SAUSALITO FERRY SCHEDULE
(JUNE THROUGH SEPT.)

	SAUSALITO	SAN FRANCISCO	SAN FRANCISCO	SAUSALITO
	Departure	Arrival	Departure	Arrival
	7:15	7:45	7:50	8:20
a.m.	8:25	8:55	9:05	9:35
	9:45	10:15	10:25	10:55
	**10:15	**10:45	**11:00	**11:30
	11:00	11:30	11:45	12:15
	**11:45	**12:15	**12:30	** 1:00
	12:30	1:00	1:15	1:45
	** 1:15	** 1:45	** 2:00	** 2:30
	2:00	2:30	2:45	3:15
	** 2:45	** 3:15	** 3:30	** 4:00
p.m.	3:30	4:00	4:10	4:40
	4:45	5:15	5:30	6:00
	6:10	6:40	6:50	7:20
	7:30	8:00	8:10	8:40
	8:50	9:20	9:25	9:55

**Operations conducted by a second ferry.

Source: Golden Gate Bridge, Highway and Transportation District, April 1974.

Alternate III All runs made by Spaulding 165

Table II shows the ferry system's capacity for each operational alternative. At the present time, a total of 6,325 passengers can be taken by the ferry to Sausalito each weekday. The proposed system will increase the passenger handling capacity from 9,325 in Alternative I to 11,250 in Alternative III, or 47 to 78 percent respectively.

Operational Alternative III is chosen as an input into the subsequent analysis. This alternative, calling for all runs made by two Spaulding 165 vessels throughout the day, would accommodate the most number of passengers and generate a relatively more intensive transportation impact.

Since no changes in land use and ground transportation system in Sausalito are assumed, the downtown peak traffic would occur at least between the hours of 4:00 p.m. and 6:00 p.m. As the traffic characteristics can better be described in hourly terms, 4:00 to 5:00 p.m. was selected for the analysis with the understanding that the impacts thus generated would generally be applicable to other peak hours. In fact, two of the three ferry arrivals scheduled for 4:00 to 6:00 p.m. occur in the first hour.

Case I. Existing System

The development of impacts requires at first a recapitulation of the magnitude of vehicular traffic generated in conjunction with the present ferry terminal system. Essentially it involves the determination of the type and extent of terminal access and the number of vehicles on major roadways.

TABLE II

WEEKDAY FERRY SYSTEM CAPACITY
(ARRIVALS IN SAUSALITO)

	EXISTING SYSTEM	PROPOSED FERRY TERMINAL SYSTEM				
		Operational Alternative I		Operational Alternative II		Operational Alternative III
Type of Vessels	M.V. Golden Gate	M.V. Golden Gate	Spaulding-165	M.V. Golden Gate	Spaulding-165	Spaulding-165
No. of Vessels	1	1	1	1	1	2
Passenger Capacity Per Vessel	575	575	750	575	750	750
No. of Vessels Arriving Sausalito Per Day	11	11	4	4	11	15
Passenger Capacity Per Day By Type Of Vessel	6,325	6,325	3,000	2,300	8,250	11,250
Total Passenger Capacity Per Day	6,325	9,325		10,550		11,250
Daily Passenger Capacity Ratio	1.00	1.47		1.67		1.78

Source: Wilsey & Ham.

Table 12 presents the steps and findings of this analysis. It indicates 5.5% and 2.0% of all peak hour vehicular traffic on Bridgeway north and south of the terminal, respectively, can be attributed to the ferry system operations.

Case II. Proposed System at Capacity of the Spaulding 165

In the absence of a dependable patronage projection for the proposed ferry terminal system, it is herein assumed the number of passengers per run is equal to the capacity of the Spaulding 165. Such a patronage projection is higher than that generated by using the existing ridership-capacity ratio.

Increasing the number and size of vessels would change the conditions of terminal access. The additional ferry passengers generated must be accommodated by an expansion of certain existing transportation facilities. Between 4:00 and 5:00 p.m., 607 more pedestrians would arrive and 293 depart downtown Sausalito. This would cause a net increase of 314 persons as well as more vehicles to operate in downtown and on Bridgeway. About 6 buses would be required to handle transit travel demand at one time, doubling the present feeder bus service. This service could be provided by stops of linehaul bus runs between Marin points and San Francisco, or feeder buses from Marin points to the ferry terminal. The proposed ferry terminal system would generate an additional 156 and 80 vehicles on Bridgeway north and south of the terminal, respectively. The increase in vehicular traffic volumes does not seem to significantly reduce the vehicular speeds in downtown Bridgeway because this roadway segment cannot accommodate many more vehicles in the peak hour period. The vehicular traffic generated will mingle with existing vehicles and result in an average increase in travel time required of all vehicles moving into and through the downtown. The impact will be relatively less significant south of

TABLE 12

EXISTING WEEKDAY PEAK HOUR FERRY SYSTEM VEHICULAR TRAFFIC GENERATION
4:00 P.M. - 5:00 P.M.

Transportation Characteristics	4:40 P.M. (Arrival)	4:45 P.M. (Departure)	Remarks
Number of Passengers Carried	286	383	Bridge District's data for an average Friday in August 1973.
Type and Extent of Terminal Access Modes Used: (a)			Estimates based upon Bridge District's interoffice memo of June 20, 1973
Transit	35% or 100 Persons	10% or 38 Persons	Linehaul and feeder buses
Auto	15% or 43 Persons	10% or 38 Persons	Private auto and taxi
Other	50% or 143 Persons	80% or 307 Persons	Walking and bicycle
Number of Feeder Buses Used	3	1	Bus Timetable B, Golden Gate Transit, March 1974
Number of Feeder Bus Trips on Bridgeway:			
North of Terminal	6	0*	*Assuming the same buses for th
South of Terminal	2	0*	4;40 p.m. arrival.
Number of Autos Used	28	26	Assuming 1.5 passengers per car
Number of Auto Trips on Bridgeway:			
North of Terminal	33	33	Assuming 50% park-and-ride; 50% kiss-and-ride; 20% trios from south and 80% from north of terminal
South of Terminal	9	9	
Total Vehicular Trips on Bridgeway:			
North of Terminal	72		
South of Terminal	20		
Approximate Capacity of Bridgeway - VPH			VPH = Vehicles Per Hour. Intersection capacity
North of Terminal	1,300		
South of Terminal	1,000		
Ratio of Ferry-Generated Vehicular Traffic to Capacity of Bridgeway:			
North of Terminal	5.5%		
South of Terminal	2.0%		

Source: Wilsey & Ham.

(a) Modal split data used for the 4:40 p.m. ferry arrival are discussed in Sections 3.5.1.2 through 3.5.1.4. The split used for the 4:45 p.m. ferry departure is based upon the assumption that most of the passengers are Sausalito visitors, thus resulting in a lower auto and transit usage.

the terminal due to fewer cars generated. Assuming 10 vehicles can pass through a signalized intersection per lane per hour, an increase of up to about 8 and 4 minutes of delay for the motorists could be expected on Bridgeway north and south of the terminal (Table 13). The additional vehicles thus generated could interfere with traffic operations at downtown and other Bridgeway intersections where no traffic signals are installed.

Case III. Existing System with Increased Patronage Demand

In the case such as this one where the project itself is a mitigating measure designed to solve existing or anticipated problems, the possible transportation implications of the "no project" situation should also be assessed.

Assuming the proposed ferry terminal system cann be developed and demand for ferry service continues to increase to a level similar to the capacity of the new ferries, another set of transportation conditions will emerge. Based upon existing vessel capacity and level of ferry service, the M.V. Golden Gate could further accommodate about 480 persons in the peak hour runs. This means 1,100 persons who must use alternative modes of transport to and from downtown Sausalito. In this case, all of them would have to rely upon bus transit or automobiles. Due to the dispersed origins of the recreational trips in the Bay Area, it is anticipated that more trip-makers would use auto than transit. Table 14 shows the possible vehicular traffic impact on Bridgeway. If the assumed ferry demand cannot be met by existing service, more than 300 vehicles would be added onto Bridgeway in the peak hour. This assumes that all these potential ferry passengers are visitors and not commuters who could bypass Bridgeway on U.S. 101. In fact, some of these potential ferry passengers would bypass Sausalito by car or bus. Although the number of vehicles generated on Bridgeway north and south of the terminal

TABLE 13

PROJECTED WEEKDAY PEAK HOUR FERRY SYSTEM VEHICULAR TRAFFIC GENERATION
4:00 P.M. - 5:00 P.M.

Transportation Characteristics	4:00 P.M.(a) (Arrival)	4:40 P.M. (Arrival)	4:45 P.M. (Departure)	Remarks
Number of Passengers Carried	750	750	750	The passenger capacity of Spaulding 165.
Type and Extent of Terminal Access Modes Used: (b)				Similar to existing conditions
Transit	35% or 263 persons	35% or 263 persons	10% or 75 persons	Linehaul and feeder buses.
Auto	15% or 112 persons	15% or 112 persons	10% or 75 persons	Private auto and taxi.
Other	50% or 375 persons	50% 375 persons	80% 600 persons	Walking and bicycle.
Number of Feeder Buses Used	6	6	2	Each bus carries 45 passengers.
Number of Feeder Bus Trips on Bridgeway: (c)				Assuming one bus serves South Sausalito and then returns to San Rafael.
North of Terminal	6	12	0*	* using the same buses for the 4:40 p.m. arrival
South of Terminal	2	2	0*	
Number of Autos Used	76	76	50	Assuming 1.5 ferry passengers per car.
Number of Auto Trips on Bridgeway:				Assuming 50% park-and-ride; 50% Kiss-and-ride; 30% from south and 70% from north of terminal.
North of Terminal	78	78	54	
South of Terminal	36	36	24	
Total Vehicular Trips on Bridgeway:				
North of Terminal	228			
South of Terminal	100			
Approximate Capacity of Bridgeway - VPH				
North of Terminal	1,300			VPH = Vehicles Per Hour. Intersection capacity.
South of Terminal	1,000			
Ratio of Ferry Generated Vehicular Traffic to Capacity of Bridgeway:				
North of Terminal	18%			
South of Terminal	10%			

Source: Wilsey & Ham.

(a) The 4 p.m. arrival continues to lay-up berth and does not depart Sausalito with passengers.

(b) Modal split data used for the 4 p.m. and 4:40 p.m. ferry arrival are discussed in Sections 3.5.1.2 through 3.5.1.4. The split used for the 4:45 p.m. ferry departure is based upon the assumption that most of the passengers are Sausalito visitors, thus resulting in a lower auto and transit usage.

(c) For 4 p.m. ferry arrival, six feeder buses must arrive before 4 p.m., and therefore are not considered as part of the 4 p.m. to 5 p.m. peak hour impact. Their departure counts as 6 bus trips. However, for the 4:40 p.m. ferry arrival, 6 bus trips arrive and depart with passengers during the 4 p.m. to 5 p.m. peak and 12 bus trips are counted.

TABLE 14

ALTERNATIVE WEEKDAY PEAK HOUR VEHICULAR TRAFFIC GENERATION (a)
4:00 P.M. - 5:00 P.M.

Transportation Characteristics	4:40 P.M. (Arrival)	4:45 P.M. (Departure)	Remarks
Total Passenger Demand	1,500	750	As assumed in the proposed terminal system.
Capacity of M.V. Golden Gate	575	575	
Excess Demand Over Capacity	925	175	
Type and Extent of "Downtown" Access Modes Used:			
Transit	25% or 230 Persons	25% or 44 Persons	Estimates based upon interpretation of GGBHTD travel data. Each bus carries 45 persons.
Auto	75% or 695 Persons	75% or 131 Persons	
Number of Buses Needed	5	1	
Number of Bus Trips on Bridgeway:			*Using the same buses for arriving and departing passengers. All buses enter south city limits.
North of Terminal	0	0*	
South of Terminal	10	0*	
Number of Autos Used	278	52	Assuming 2.5 persons per car.
Number of Auto Trips on Bridgeway:			
North of Terminal	139	26	Assuming 50% enter south and 50% enter north city limits.
South of Terminal	139	26	
Added Vehicular Trips on Bridgeway:			
North of Terminal	165		Downtown inbound traffic caused by potential ferry passengers using land transport systems.
South of Terminal	175		
Vehicular Traffic Generated on Bridgeway By M.V. Golden Gate at Full Capacity: (b)			
North of Terminal	123		
South of Terminal	35		
Total Vehicular Trips on Bridgeway:			
North of Terminal	288		
South of Terminal	210		
Approximate Capacity of Bridgeway - VPH			
North of Terminal	1,300		VPH = Vehicles Per Hour. Intersection capacity.
South of Terminal	1,000		
Ratio of Vehicular Traffic Generated to Capacity of Bridgeway			
North of Terminal	22%		
South of Terminal	21%		

Source: Wilsey & Ham

(a) Major Assumptions: Maintain existing vessel and level of service.
Each ferry operation only carries 575 passengers.
Total demand similar to that generated by the propsoed terminal system.

(b) Using existing patronage and vehicular traffic relationship developed in Table 12 which shows each ferry passenger generates 0.1 and 0.03 vehicles on Bridgeway north and south of the ferry terminal, respectively.

would be the same, impacts will vary due to differing roadway capacities. In this case, an increase of up to about 20 minutes of traffic delay to motorists could be realized.

Increasing the influx of autos to downtown will not cause an overall reduction in pedestrian traffic. Whatever the mode of arrival would be, the final leg of the downtown trip must be made as a pedestrian. Hence, this alternative would create a large volume of pedestrian as well as auto traffic and generate more conflicts between the various modes. Other problems caused by this alternative include:

1. Provision of parking spaces to accommodate more than 300 vehicles at the peak hour; and

2. Traffic impact caused by vehicles leaving downtown at later hours.

3. Traffic impact on the Golden Gate Bridge and the City of San Francisco.

A summary of existing and possible peak hour impacts generated by three operational programs is presented in Table 15.

TABLE 15

SUMMARY OF WEEKDAY PEAK HOUR IMPACT - SPRING 1976

	CASE I	CASE II	CASE III	REMARKS
Type of Ferry Terminal System	Existing System	Proposed System	Existing System	Case III is a "no project" alternative
Type of Vessel	M.V. Golden Gate	Spaulding 165	M.V. Golden Gate	
Patronage Level	Existing level	At Capacity	At Capacity of (a) Spaulding 165	
Total Peak Hour Demand	669 Passengers	2,250 Passengers	2,250 Passengers (b)	
Number of Vehicles Generated on Bridgeway (d)				
North of Terminal	72	228	288 (c)	
South of Terminal	20	100	210 (c)	
Additional Vehicles Generated on Bridgeway (Both Directions) (e):				
North of Terminal	0	156	216(191)	( ) denotes downtown inbound traffic volumes
South of Terminal	0	80	190(182)	
Additional Travel Delay Experienced by Bridgeway Motorists (in minutes):				
North of Terminal	0	7.8	19.1	Assuming each signalized intersection can accommodate 10 vehicles per lane per minute.
South of Terminal	0	4.0	18.2	
Total Travel Time Experienced by Bridgeway Motorists Between Johnson and Princess Streets (in minutes):				
North of Terminal	2.0	9.8	21.1	Including delay caused by traffic signals. Existing data from Schoonmaker EIR Traffic Impact, Feb. 8, 1974.
South of Terminal	2.5	6.5	20.7	

Source: Wilsey & Ham

(a) The capacity of S-165 vessel is assumed to derive hypothetical total patronage. This patronage level could not be physically accommodated with M.V. Golden Gate. See Note (b).

(b) Including ferry patrons and those who must use other transport modes to downtown Sausalito.

(c) Including both one-way and two-way traffic generated.

(d) All the vehicular traffic figures presented here together with their associated assumptions can be found in Tables 12, 13 and 14.

(e) Vehicles added onto Bridgeway as a result of an increase in ferry patronage assumed for Cases II and III.

5.5.1.2 Weekend Transport Conditions (Saturdays, Sundays, and Holidays)

According to the proposed ferry schedule, weekend runs will be conducted between the hours of 9:45 a.m. and 9:30 p.m. Two vessels, one of which could be the existing M.V. Golden Gate, will operate between terminals in San Francisco and Sausalito. After 6:00 p.m., only one vessel will operate (Table 16). The expanded service changes the number of operations (departures and arrivals) in Sausalito from 16 to 26, an increase of 63 percent.

Two major operational alternatives can be envisioned:

Alternative I	Most runs made by M.V. Golden Gate, supplementary runs by Spaulding 165's; and
Alternative II	All runs made by Spaulding 165's.

The effect of each operational alternative on ferry system capacity is shown in Table 17. At present, 4,600 passenge can travel via M.V. Golden Gate to Sausalito. The proposed system will increase the passenger handling capability from 8,350 in Alternative I to 9,750 in Alternative II, or 82 and 112 percent, respectively.

TABLE 16

PROPOSED WEEKEND SAUSALITO FERRY SCHEDULE
(JUNE THROUGH SEPTEMBER)

	SAUSALITO	SAN FRANCISCO	SAN FRANCISCO	SAUSALITO
	Departure	Arrival	Departure	Arrival
	9:45	10:15	10:30	11:00
	10:30	**11:00	**11:15	**11:45
	11:15	11:45	12:00	12:30
	**12:00	**12:30	**12:45	** 1:15
a.m.	12:45	1:15	1:30	2:00
	** 1:30	** 2:00	** 2:15	** 2:45
	2:15	2:45	3:00	3:30
	** 3:00	** 3:30	** 3:45	** 4:15
p.m.	3:45	4:15	4:30	5:00
	** 4:30	** 5:00	** 5:15	** 5:45
	5:15	5:45	6:00	6:30
	6:45	7:15	7:30	8:00
	8:15	8:45	9:00	9:30

**Operations conducted by a second ferry.

Source: Golden Gate Bridge, Highway and Transportation District, April 1974.

TABLE 17

WEEKEND FERRY SYSTEM CAPACITY ARRIVALS IN SAUSALITO

	EXISTING SYSTEM	PROPOSED FERRY TERMINAL SYSTEM		
		Operational Alternative 1		Operational Alternative II
Type of Vessels	M.V. Golden Gate	M.V. Golden Gate	Spaulding 165	Spaulding 165
No. of Vessels	1	1	1	2
Passenger Capacity Per Vessel	575	575	750	750
No. of Vessels Arriving Sausalito Per Day	8	8	5	13
Passenger Capacity Per Day By Type Of Vessel	4,600	4,600	3,750	9,750
Total Passenger Capacity Per Day	4,600	8,350		9,750
Daily Passenger Capacity Ratio	1.00	1.82		2.12

Source: Wilsey & Ham.

Case I: Existing System

Prior to the evaluation of downtown pedestrian and traffic, a description of the existing relationship between the two modes is required. This was achieved through the following steps:

1. Surveys of downtown pedestrian rights-of-way and barriers which affect pedestrian flow;

2. Determination of the rights-of-way which could be used by pedestrians;

3. Based upon observed and estimated pedestrian density, calcuate the total number of people in downtown;

4. Obtaining travel times on downtown Bridgeway; and

5. Determining the amount of travel time that could be attributed to the ferry pedestrians.

The findings indicate that the northbound vehicular traffic moves through the downtown area at twice the average speed of the southbound vehicles. As an individual, the pedestrian only generates an insignificant impact upon vehicular flow. Assuming each pedestrian generates the same amount of delay to vehicular traffic, ferry passengers would account for about 16 percent of the total vehicular travel time on downtown Bridgeway at peak hours (Table 18).

TABLE 18

IMPACT OF FERRY-GENERATED PEDESTRIAN ON BRIDGEWAY VEHICULAR TRAFFIC AT PEAK HOUR 1:00 P.M. - 2:00 P.M.

		EXISTING SYSTEM	PROPOSED SYSTEM	Remarks
1.	Gross Downtown Pedestrian Area (sq.ft.)	40,810	40,810	All sidewalk areas shown in Figure
2.	Net Downtown Pedestrian Area (sq.ft.)	29,015	29,015	Subtract unusable areas (utility poles, mail boxes, etc.) from 1.
3.	Estimated Pedestrian Density (sq.ft./person)	10	13	Pedestrian Planning and Design - John Fruin, MAUDEP 1971
4.	Pedestrians on Downtown Sidewalks	2,232	2,900	
5.	Pedestrians in Downtown Buildings	1,500[a]	1,750[b]	(a) 50 buildings at 30 persons each (b) 50 buildings at 35 persons each
6.	Total Number of Persons in Downtown	3,732	4,650	
7.	Pedestrians Arriving by Ferry	582	1,500	From Tables 8 and 17.
8.	Pedestrians Arriving by Other Modes	3,150	3,150	
9.	Travel Time on Bridgeway Between Johnson and Princess Streets (in minutes):			Traffic Impacts - Schoonmaker FIR February 8, 1974 Including delay caused by traffic signals.
	Northbound Traffic	3	3.8	
	Southbound Traffic	6	7.5	
10.	Travel Time in "9" Caused by Each Pedestrian (in minutes):			
	Northbound Traffic	0.00081	0.00081	
	Southbound Traffic	0.00162	0.00162	
11.	Travel Time in "9" Caused by Ferry Patrons (in minutes):			
	Northbound Traffic	0.47	1.27	
	Southbound Traffic	0.94	2.44	
12.	Travel Time in "9" Caused By Non-Ferry Patrons (in minutes):			
	Northbound Traffic	2.53	2.53	
	Southbound Traffic	5.06	5.06	

Source: Wilsey & Ham.

Case II. Proposed System at Capacity of the Spaulding 165

Based upon the proposed weekend ferry schedule, a maximum of two vessels will arrive Sausalito each hour during the afternoon when downtown traffic flow is the heaviest. In this analysis, only the traffic during the hour of 1:00 to 2:00 p.m. is evaluated, assuming the impacts thus generated will be typical of the other peak hours.

Existing statistics show that the number of ferry passengers accumulated in Sausalito at the peak hour is equal to the number of people arriving by ferry in that hour. (Also see discussions of environmental setting, Section 3.5.0). Since two ferries of the Spaulding 165 class will arrive at the Sausalito Terminal between 1:00 and 2:00 p.m., it is anticipated that a total of 1,500 ferry passengers will be in downtown Sausalito at that time. A higher pedestrian density in and out of the downtown buildings is also projected. Such an overall higher activity level would result in an increase of about 1,000 persons in downtown. Incidentally, all of these people will be brought to Sausalito by the proposed ferry system. The additional pedestrians are estimated to increase the travel time of northbound and southbound vehicular traffic by 0.8 and 1.5 minutes, respectively. As shown in the proposed ferry terminal master plan, the passenger waiting area would be large enough to accommodate all departing ferry patrons, thus resulting in the elimination of existing pedestrian corridors created on Parking Lot No. 1 Park and El Portal Streets prior to each ferry departure.

Case III. Existing System with Increased Patronage Demand

In the event that no ferry system expansion is implemented and patronage continues to rise to Case II level, a diversion of many potential ferry passengers to land transport systems can be anticipated. The result would be a further influx of vehicular traffic into downtown Sausalito. Based upon the modal

usage criteria established in Table 14 of this report(7), all of the potential ferry passengers (918) could generate 138 and 147 vehicles in the peak hour on Bridgeway north and south of the terminal, respectively. Eventually people arriving by vehicular modes become pedestrians in the downtown area. This means that in addition to the traffic delay caused by pedestrians, several other problems emerge:

1. Additional delay caused by an increase in vehicular traffic;
2. More parking spaces are required to accommodate the extra vehicles generated;
3. Traffic impact caused by vehicles leaving downtown at later hours;
4. Traffic impact on the Golden Gate Bridge and the City of San Francisco.

A summary of existing and possible peak hour impacts generated by various operational alternatives is presented in Table 19.

---

(7) Table 14 shows that each potential ferry patron generates 0.15 and 0.16 inbound vehicles in the peak hour on Bridgeway north and south of the terminal, respectively.

TABLE 19

SUMMARY OF WEEKEND PEAK HOUR IMPACT - SPRING 1976

	CASE I	CASE II	CASE III	REMARKS
Ferry System Characteristics	Existing System	Proposed System	Existing System	
Type of Vessel	M.V. Golden Gate	Spaulding 165	M.V. Golden Gate	
Patronage Level	Existing Level	At Capacity	At Capacity of Spaulding 165(a)	Similar ferry patronage for Case II and III
Number of Ferry Passengers Accumulated in Downtown (b)	582	1,500	582	
Number of Additional Vehicles Generated on Bridgeway:				
North of Terminal	0	0	138	Downtown inbound vehicles only.
South of Terminal	0	0	147	
Number of Additional Parking Spaces Required	0	0	285	Assuming all vehicles will park.
Travel Time Delay on Downtown Bridgeway Caused By Pedestrian Traffic (in minutes):				
Northbound Traffic	3	3.8	3.8	From Table 18.
Southbound Traffic	6	7.5	7.5	
Travel Time Delay Caused by Additional Vehicles (in minutes):				
Northbound Traffic	0	0	13.8	Assuming each signalized intersection can accommodate 10 vehicles per lane per minute
Southbound Traffic	0	0	14.7	
Total Travel Time Delay (in minutes):				
Northbound Traffic	3	3.8	17.6	
Southbound Traffic	6	7.5	22.2	

Source: Wilsey & Ham.

(a) The capacity of S-165 vessel is assumed to derive total patronage.
This patronage level could not be physically accommodated with M.V. Golden Gate.
Potential ferry patrons must use land transport modes to downtown Sausalito.

(b) All pedestrian traffic figures presented here together with their associated assumptions are found in Table 18 .

5.5.2 Relationships Between the Proposed Ferry Terminal System and Other Environmental Changes

Based upon the foregoing analysis, increasing ferry travel demand would increase the number of pedestrians and vehicles in Sausalito downtown and extend the travel time delay which presently occurs in peak hours. The analysis also indicates that if an increasing demand cannot be accommodated by the present ferry terminal system, a more prolonged traffic congestion period and significant parking problem would emerge. The analysis is based upon the maximum impact situation in which the ferry travel demand is equal to the capacity of the new ferry. Between the assumed maximum and present demand there exists numerous patronage levels causing differing degrees of local transportation impacts. The extent of future local ferry impact hinges on two central issues: the overall demand for transportation services in Sausalito, and the manner in which Sausalito handles this demand.

Historically, the City has experienced an annual weekend traffic increase of about 7 percent per year (Sausalito City Department of Public Works). Assuming no major local policy changes, it is reasonable to anticipate the existing level of local traffic volume will be maintained if not increased as the county and regional population levels continue to rise and recreational travel to become more popular. The extent of usage of various modes of transport is closely related to the availablility of transport systems and their relative levels of service performance. Generally,

the Sausalito trip-makers employing land transport modes tend to be relatively more tolerant of a lower level of traffic service. This is demonstrated on some weekends where vehicular traffic congestion was extended to the south city limits.

In order to formulate proper transportation strategies consistent with Sausalito's goals and policies, it is desirable to consider some or all of these factors which have either local or regional significance:

1. The number, type, and location of parking facilities to be provided in the City;

2. The need for and extent of developing alternative local transport modes to the automobile;

3. The impact of development in Marinship upon local transport services demand;

4. The implications of ABAG's emerging population distribution policies upon recreational trips;

5. The impact of the Golden Gate National Recreational Area and its associated transport systems;
6. The changes in regional accessibility facilitated by BART's transbay operations and possible extensions.

Some of the policies and implications concerning these issues have been formulated and agreed upon while others are still emerging. Exactly how the City of Sausalito will interpret and respond to these and other development issues is a political exercise which determines the overall performance of her major streets and hence the relative significance of the ferry terminal system impacts. In the absence of an identifiable future local transportation system, maximum ferry terminal system impacts have been developed.

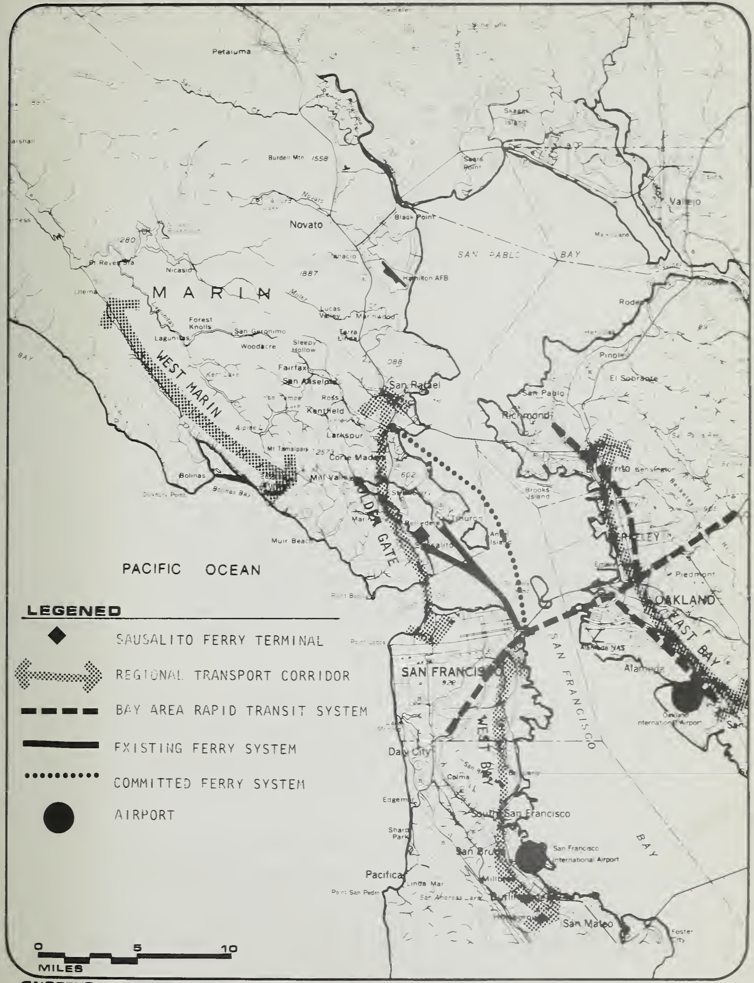
5.5.3 Implications of the Proposed Ferry Terminal System Upon the Larger Transport Environment

Impact of the proposed ferry terminal can be assessed at different scales depending upon the context within which the system is considered to operate. In addition to serving Sausalito's transport needs, the terminal is also a component of Marin County's transport system as well as the Bay Area regional transport system. Figure 7 depicts the major elements of this transport complex and their interrelationships. The larger multimodal system satisfies differing travel requirements. As such, the operation of the terminal naturally has local, county, and regional significance. The following sections examine the role of the terminal system in larger transport environments, keeping in mind the different and often conflicting interests among various levels of government.

5.5.3.1 County Transport Implications

The terminal naturally bears a most direct relationship with Marin County. At present the County's planning policies place great emphasis on transit, including bus and ferry systems.

The Marin County General Plan proposes that existing ferry services to Sausalito and Tiburon be supplemented in stages with new services, initially to Larkspur and possibly in the future to Las Gallinas Creek and Novato (Marin County, 1973).



sausalito ferry terminal EIR
PREPARED BY:
Wilsey & Ham

REGIONAL TRANSPORTATION SYSTEM

FIGURE 7

Recreation traffic in Marin is becoming a greater problem than commuter traffic. The existing transportation system causes heavy weekend congestion on highways and in neighborhoods, especially in Southern Marin. The County plan states that transit usage for recreational travel is a necessity for environmental conservation in areas of heavy visitation; adequate bus and ferry services should be operational as soon as possible.

The County General Plan continues:

> "Terminal locations for recreational transportation are also important. If the system only picks up passengers within Marin County, traffic on the Golden Gate Bridge and Route 101 would continue to be excessive, since more than two-thirds of weekend visitors come from San Francisco. Also, large amounts of land would have to be provided for parking, unless feeder lines were used, in which case many potential passengers might be lost because of the need to transfer. Main terminal and pick-up locations would probably best be located in areas where most visitors originate, in San Francisco and the East Bay, with secondary pick-up points in Marin, at ferry terminals for example. Both terminals and routes should be planned to minimize congestion within East Marin, as well as West Marin, communities."

Basically, the operation of the existing ferry system in Sausalito conforms with county policies. However, with the implementation of the proposed ferry system, other changes can be ancitipated.

1. As the proposed ferry systems, including the one at Larkspur, intend to employ new vessels having different docking characteristics than the M.V. Golden Gate, the existing terminal in Sausalito will not be able to realize the operational flexibility through the standardization of components. In other words, new vessels will not be able to serve the

existing Sausalito terminal or substitute for the M.V. Golden Gate operations when needed. With the opening of the Larkspur Terminal, no ferry services between Larkspur and Sausalito can be implemented without significantly reducing the level of service offered by the M.V. Golden Gate. (If the existing ferry is required to serve three terminals instead of two, ferry service headways will be increased.) Any intra-county ferry service will certainly absorb some vehicular traffic on the segment of U.S. 101 between Larkspur and Sausalito.

2. As Marin County intends to further the development of the bus transit system, the level of public land transport service will increase. This may in some cases reduce or eliminate the need for private automobiles. In the event that a decrease in auto ownership occurs, people will place a higher demand and value on the total transit system. Under such a condition, the best and optimal transit system would be one in which the improvement on land transit is complemented with that of water transit. This is generally regarded as internal balance - a balance within the public transportation system. The proposed ferry terminal system tends to contribute to this objective.

5.5.3.2 Regional Transport Implications

Bay Area regional transportation planning is the responsibility of the Metropolitan Transportation Commission. The Commission

has identified the Sausalito Ferry System as a transportation element bearing regional significance and interest. The Golden Gate corridor is considered a major transport corridor in the nine-county Bay Region. Some of the Commission's objectives and policies relating to the ferry operations are stated below(8):

1. Transportation programs shall consist of well coordinated multimodal systems to meet demonstrated travel demand which is consistent with policies of other regional agencies:

2. Relative priority should be given to transit for an area where a high proportion of intercity trips are between core areas of major cities or where most trips are to core areas in general and where travel demand exceeds the capacity of an area to absorb more vehicular traffic without substantial environmental/social damage or where further capacity for automobile movement or storage is very costly.

3. The speed, frequency, and service efficiency of transit shall be increased to enable it to compete with the automobile as a feasible and attractive choice.

4. Programs shall be developed to use transit to accommodate an increasing proportion of non-peak period and non-work related trips, including service to high usage recreational areas.

---

(8) Regional Transportation Plan, Metropolitan Transportation Commission, June 1973.

Again, the existing ferry service, as from the county perspective, has gone a long way in meeting the Commission objectives and policies. However, development of the proposed ferry system will afford even more regional mobility than currently realized. The proposed system will further improve the extent to which the regional transport objectives are met, resulting in a reduction of auto usage along one of the region's heavily traveled corridors.

In summary, the implementation of the proposed ferry system will increase the level of traffic delay at the local level. Such a delay would be smaller than that caused by employing the existing system to accommodate an increased ferry demand. The proposed system is generally compatible with higher level government objectives and policies. Relatively speaking, the number of local people affected will be small, but impact intense. At the regional level, the number of people affected will be large but impact not intense. "Because of the multiple values which must be considered, goals will sometimes be in conflict. There are no rigid priorities which can be applied to all situations, and each program must be evaluated in terms of the extent to which it best achieves an overall balance between conflicting goals", states Metropolitan Transportation Commission.

APPENDIX F

ECONOMICS REPORT

by

LeBlanc & Company

Planning Economists

LeBlanc & Company

L. LLOYD LEBLANC
DANIEL J. O'DONOGHUE
WILLIAM W. LEE

July 9, 1974
537.01

Mr. Michael Rice
Wilsey & Ham
1035 East Hillsdale Blvd.
Foster City, California
94404

Dear Mike:

Enclosed are sections of Draft EIR on Sausalito Ferry Terminal where changes in proposed weekend/holiday service required changes in Section 5.0 (pp. 5-20 to 5-34). A couple of other minor changes are made, but the corrections as noted take into account the cut in S-165 arrivals as discussed with Joe Eng.

Call if anything looks out of line.

Cordially,

LEBLANC & COMPANY

L. Lloyd LeBlanc

LLL:lrt
Enclosure

22 BATTERY STREET | SAN FRANCISCO, CALIFORNIA 94111 | (415) 989-9450

EIR SECTION 3.6.0 (ECONOMIC ACTIVITY AND EMPLOYMENT)

Economic activity in Sausalito may be concentrated into these major groupings: (1) boat construction, repair and services, including marina services and chandelry; (2) limited, specialized manufacturing and distribution; (3) local and visitor-oriented retailing and services, and (4) professional and technical services, including real estate, architecture and engineering, finance, law, and the like.

Of these major categories, the most visible are the boating and manufacturing activities on the waterfront north of Central Sausalito, the business and commercial activities making up Central Sausalito, and the activities in the Caledonia-Bridgeway zone. Slowly emerging into more prominence, however, are actual or planned concentrations of professional office space and other commercial centers throughout the waterfront zone north of Central Sausalito. Already within the entire north waterfront zone are located a number of regional-serving employers that provide a significant number of jobs to Sausalito residents and others commuting into Sausalito to work. Important members of this group are Heath Ceramics (pottery), the U. S. Army Corps of Engineers, the E. D. Bullard Company (industrial safety equipment), a number of sailmakers and rigging specialists, yacht brokers, boat haulout and storage yards (Jerry's, Keeler, Sausalito Marina, Sea Ventures, Anderson's, Alex & Bob's, Channel Marine, and others). Design, graphics and printing firms can also be found here (Sasaki-Walker-Roberts; Desmond-Muirhead; Marin Graphics; The Wedell Group and many small offices), along with realtors, attorneys and other service organizations.

Central Sausalito, of course, contains the bulk of the city's retail and commercial services inventory, as well as numerous restaurants on and off the water's edge. The Sausalito City Offices are located here, on Bridgeway, as are two banks (Wells Fargo and Bank of America). Retail stores are small, and oriented to higher-priced impulse purchasing of apparel, jewelry and specialty items. The only major concentration of shops in one structure is the well-known Village Fair complex on Bridgeway. Well known restaurants and watering spots dot the area, including Ondine and The Trident, Scoma's, The Spinnaker, The No Name Bar, Le Vivoir, and others. The Tides Bookstore is well patronized at all hours, The Marin Fruit & Grocery provides for local food purchases.

The Caledonia-Bridgeway zone is a mixture of stores, offices and services more locally-oriented than the Central Sausalito zone.

TABLE 3.6.1

MAJOR EMPLOYERS LOCATED IN SAUSALITO, 1974

(Establishments/Agencies Employing 50 or More Persons)

Name	General Location
Alta Mira Hotel	Central Sausalito
E. D. Bullard Co.	North Waterfront
Geo. T. Gerhardt Co.	North Waterfront
Heath Ceramics, Inc.	North Waterfront
Sausalito Public Schools	North Waterfront and School Sites
U. S. Army Corps of Engineers	North Waterfront
City of Sausalito	Central Sausalito and Fire Stations
Various restaurants, gas stations and supermarkets located city-wide	

Source: Marin County Chamber of Commerce

Sausalito's cinema (The Marin) is here, and a few notable retail stores are nearby. At least three food markets (Caledonia Market and others) are also located in this vicinity serving the uphill residential areas.

Visibly absent from Sausalito's mix of commercial activities is any major new hotel/motel facility. The city does contain three charming older facilities (The Sausalito Hotel on Bridgeway in the Central Zone, the Alta Mira and Casa Madrona above Central Sausalito). No new facilities have been constructed in the last forty years, and this has been recognized (by Howard Johnson's locating in Tamalpais Valley just north of Sausalito, and by numerous waterfront property owners).

Outside direct payrolls from employers and the earnings of self-employed professional people, Sausalito's major area of activity is connected to retail sales and services. An examination of the importance of these categories to Sausalito indicates that:

- Sausalito contains some three percent of Marin County's residents, but generates seven percent of taxable retail sales countywide.
- Sausalito retail sales per capita (1973 levels) is roughly \$3,000; for Marin County as a whole the figure is \$1,400.

Within the actual reporting categories of retail sales and services (as recorded by the State Board of Equalization), Sausalito shows a distinct shift towards volume oriented to visitors; for instance in 1973, Sausalito recorded eating and drinking sales totaling 36 percent of all sales; corresponding numbers in other Marin communities were substantially lower. Sausalito records a small volume of home furnishings/appliance sales (two percent), but a high volume of apparel sales (10 percent). See Table for community comparisons discussed here.

3.6.4 3.6.2.

Growth in the population of Sausalito over time may also be reflected in the 1963-1973 retail sales pattern. For instance, Table shows that retail sales outlets in Sausalito in 1972-73 are at an all time high, and double that of 1968. General merchandise outlets have stabilized, and eating and drinking outlets leveled off after increasing by one-third since 1963.

Sales have increased significantly. Volume in apparel shops, for instance, is up to \$2.7 million (from \$.6 million in 1963). Eating and drinking volume has more than doubled (\$9.9 million against \$4.8 million). Even allowing for inflation, Sausalito apparel and restaurant sales have grown rapidly since the mid-sixties.

TABLE 3.6.2

SELECTED RETAIL TRADE STATISTICS
CITY OF SAUSALITO
1963-1973

	Apparel			Eating/Drinking			General Merchandise Outlets[b]	All Other Outlets[c]
	Outlets	Sales[a]	% Change	Outlets	Sales[a]	% Change		
1963	12	$ 636	-	28	4,867	-	1	31
1964	11	711	12.0	28	5,298	9.0	1	36
1965	13	861	21.0	26	4,960	(6.0)	2	39
1968	14	1,056	23.0 (3 yr.)	29	6,415	29.0 (3 yr.)	4	58
1969	17	1,402	33.0	28	6,678	4.0	4	72
1970	26	1,703	21.0	33	7,457	12.0	3	80
1971	21	2,143	26.0	38	7,896	6.0	3	76
1972	25	2,378	11.0	38	9,126	16.0	4	83
1973	24	2,725	15.0	37	9,938	9.0	3	82

---

[a] Sales in thousands of dollars (taxable only).

[b] No actual sales available.

[c] Excludes automotive repair, garages, etc.

Source: State of California

TABLE 3.6.A

SELECTED REPORTING CATEGORIES AS A SHARE OF TOTAL RETAIL SALES, VARIOUS MARIN COUNTY COMMUNITIES
1 9 7 3

	Percentage Share - 1973 Retail Sales				
	Sausalito	Mill Valley	San Rafael	Novato	Total Marin County
Apparel	10.0%	4.0%	7.0	1.0%	6.0%
Home Furnishings	2.0	3.0	6.0	4.0	5.0
Eating and Drinking	36.0	15.0	6.0	11.0	12.0

Sources: State of California
LeBlanc & Company

3.6.3.

Total retail sales (all reporting outlets) also are up, significantly - even in real terms. Table illustrates this growth pattern, and some of the erratic fluctuations in sales volume since 1968 (not fully explainable).

Overall, the importance of retail sales and services to Sausalito is likely to grow, and the impact of levels of visitation to Sausalito will be considerable - since the city cannot by itself generate the volumes supported by outsiders.

In total, there are in Sausalito just under one hundred retail outlets of all types (stores, grocery/supermarkets, restaurants and bars, service stations and the like), which is a hefty concentration for a small city of some three thousand households. How much of this concentration survives entirely on visitor expenditures is difficult to tell.

Further, Sausalito's future may be tied heavily to its role as a visitor destination. Many of the current proposals for waterfront development include plans for new retail shops, restaurants and even hotels. Whether or not market support exists for all of these proposals is better known to the respective owners or developers. If, in fact, development of this type occurs, Sausalito's provision of visitor services will be much reinforced. If these projects do not emerge, visitation will continue to be hosted by the relatively small, concentrated area of services in Central Sausalito.

TABLE 3.6.3

GROWTH IN RETAIL SALES, CITY OF SAUSALITO AND MARIN COUNTY
1963-1973

	Taxable Retail Sales[a] Sausalito	Change (%)	Taxable Retail Sales[a] Marin County	Change (%)
1963	$ 9,396	-	$166,485	-
1964	10,607	13.0	187,507	13.0
1965	11,627	10.0	203,546	9.0
1966	NA	-	212,880	5.0
1967	NA	-	222,518	5.0
1968	15,561	34.0 (3 yr.)	253,964	14.0
1969	17,358	12.0	275,083	8.0
1970	18,863	9.0	282,021	3.0
1971	20,210	7.0	312,104	11.0
1972	24,062	19.0	366,278	17.0
1973	27,370	14.0	424,214	16.0

---

[a] Sales in thousands of dollars

Source: State of California

EIR SECTION 3.7.0 (POPULATION)

Sausalito's population (viewed within the larger context of a "sphere of influence") could be identified as having these characteristics:

- The population covers the entire spectrum of household types, economic and social status, and interests or beliefs.
- The wealthy segment of this population is concentrated in the hills of southern Sausalito; the modestly affluent and those of very limited income and status are in the northern area (particularly emphasized if one includes Marin City households in the aggregate population).
- Sausalito's family profile is changing from one of moderately sized households with few children to one of smaller households (more childless families and singles).

The diversity of the resident population is also reflected in the occupations of labor force members. By far, the largest share of the labor force is occupied with professional, government, and institutional endeavors. A large number of Sausalito's residents are self-employed. Many work for federal-state-county-city agencies, in Marin and San Francisco locations. Some work in local manufacturing, boating and commercial enterprises.

Without question, however, the bulk of Sausalito's resident labor force works elsewhere - primarily in San Francisco, some elsewhere in Marin County. The 1970 U. S. Census compiled statistics on Sausalito residents commuting daily to other locations for employment; other agencies have subsequently developed similar information (County of Marin, Association of Bay Area Governments, Metropolitan Transportation Commission, GGBHTD). It is estimated that at the current time, some 70 percent of Sausalito's 4,500 person labor force live in Sausalito, but work in other locations, primarily San Francisco.

Available socioeconomic data related to employment and income supports the premise that most of Sausalito's job holders are employed in institutional, service and professional occupations - and that their incomes are well above average. A glance at Sausalito's census-reported median family income ($15,336 in 1969) illustrates this; the Marin County figure for 1969 is $13,935.

TABLE 1.0.0

SELECTED SOCIOECONOMIC DATA COMPARISONS, SAUSALITO AND MARIN COUNTY, 1970

Item	City of Sausalito	Marin County	Sausalito Percentage of Marin County
Resident Population	6,158	206,758	3.0%
Households	3,094	67,606	5.0
Average Household Size	1.98	2.94	-
Median Age (Years)	29.5	33.3	-
Civilian Labor Force	4,189	84,557	5.0
Employed	3,971	80,620	5.0
Unemployed (%)	5.2	4.7	-
Personal Income			
Median Household	$15,336	$13,935	110.0
Mean Household	$18,866	$16,136	117.0
Taxable Retail Sales	$18,863,000	$282,021,000	7.0
Retail Sales Per Capita	$3,063	$1,440	213.0
Number of Retail Outlets	83	1,684	5.0%

Sources: U. S. Census, 1970
State of California

EIR SECTION 3.8.0 (HOUSING)

A quick study of the Sausalito housing market indicates that residential opportunities in Sausalito are expensive, in short supply, and likely to remain so. This condition is prevalent throughout Southern Marin, where a combination of mortgage market rates, construction costs, public resistance to development and water/sewer system problems have (1) seriously cut housing production and (2) artifically increased prices of the stock - significantly.

Sausalito's situation is made more unique by a distinct lack of available, readily developable land. Limited sites (only a handful) exist in the older hillside neighborhoods. The lands west of Freeway 101 (primarily the Wolfback Ridge area) are between purchase for public use (as part of the Golden Gate National Recreation Area) and limited development for expensive residences.

Marina Vista (at Nevada Street above Bridgeway) is Sausalito's only "project" of any size. This attached (townhouse) condominium project has weathered a number of financial and other problems, and is now in the final stages. Units have been reduced in size (3 to 2BR) and raised in price (level is now $58,000-up). Absorption has been supported, significantly, by a current lack of competition in Mill Valley and Tiburon.

Additional housing in Sausalito will come, if at all, on the waterfront (north of Central Sausalito to Waldo Point). Numerous proposals for water-oriented residential development are before Sausalito's public bodies. None are yet approved.

Brokers active in Sausalito report less than one percent vacancy in the available inventory, with quality single-family dwellings now priced above $70,000, and apartment rentals in excess of $250 on average. Even older bungalows and cottages are selling in the $40-50,000 range, or renting for high returns. The future for Sausalito, due to its location, amenities and topography, is for a continuation of this current trend.

EIR SECTION 5.6.0 (ECONOMIC-EMPLOYMENT IMPACT)

Expansion of Marin County-San Francisco ferry service by GGBHTD will, over time, generate certain specific and general impacts on Sausalito's economy and employment profile. The nature of the proposed project under review, that of a transportation system facility, makes an evaluation of these impact questions relatively straightforward. That is, the proposed facility (the terminal itself) and the increased level of transportation service considered (a larger terminal plus additional vessels) lead this examination directly toward these questions:

- What categories of impact will be brought about by Ferry Terminal and service expansion?
- What are the expected changes in characteristics of the ferry operation after expansion?
- How does this affect Sausalito's economy and employment, directly and indirectly?

Ample evidence exists to show that the relationships between transportation terminals and an urban economy are predominantly these: (1) pressures for residential locations adjacent to the facility, line, station, etc.; (2) increased spending for goods and service by patrons of the transportation; (3) a concurrent shifting land use pattern, with the facility as the focal point; and (4) the "congestion" aspects, both negative and positive.

Thus, we begin this element of the analysis by examining the present and possible future service levels of the ferry operation.

Currently available schedules of equipment (bus and ferry) utilization, headways, and related information indicate that there are options as to the actual ferry system service to be effective to and from the Sausalito Ferry Terminal. GGBHTD and Wilsey & Ham have provided ranges of ferry utilization for (1) weekdays and (2) weekends and holidays. Overall, alternatives exist that include:

- Predominant use of the existing M. V. Golden Gate (max capacity 575 passengers)
- Predominant use of Spaulding (S-165) craft (max capacity 750 passengers)

- A combination of MVGG and S-165 vessels

5.6.1

Moving first to weekday operating alternatives, we find (see Table) that possible vessel utilization at various arrival/departure schedules can result in the following: (1) maximum passenger arrivals/departures of 9,325 riders - using MVGG and one S-165; (2) a maximum capacity of 10,550 riders each way with an S-165 emphasis, and (3) a maximum capacity of 11,250 each way with full S-165 service. This maximum range of 9,325-11,250 arrivals to Sausalito daily compares with full capacity of some 6,325 arrivals and 5,750 departures daily under the present MVGG utilization (June to September peak service).

For weekend/holiday operations, we see that (1) a combination of MVGG and Spaulding vessels could deliver 8350 [redacted] riders to Sausalito and remove 8925 [redacted] patrons; (2) S-165 vessels only would provide for 9150 [redacted] arrivals and 10500 [redacted] departures, and (3) the existing MVGG service at capacity could provide for 4,600 arrivals and departures each weekend day or holiday. Please refer to Table 5.6.2.

5.6.3 5.6.4

Now, to attempt a translation of these service alternatives to visitor levels: Tables / and / illustrate calculations of potential visitors (i.e. non-residents) to Sausalito under existing and expanded service alternatives. For instance, full use of the MVGG could provide for 6,325 daily arrivals (weekday schedules). We have estimated that the weekday commuter patronage would account for slightly less than 10% of total capacity (or 460 daily), and pleasure visitors the remainder of arrivals (5,865 passengers). These counts include estimated non-resident passenger arrivals only (commuter totals are estimated to be roughly split 50-50 between residents and non-residents).

This methodology has been employed in all the visitor level projections contained in Tables / and /. A close examination of the figures shows that: 5.6.3 5.6.4.

- At maximum existing capacity, weekday visitation to Sausalito could reach a level of 6,325 riders (5,865 pleasure visitors); and the weekend/holiday level some 4,600 passengers (4,485 pleasure visitors).

- Expanded service alternatives, again at maximum capacity and patronage, could provide for a range of 9,325 - 11,250 weekday visitors (8,865-10,650 pleasure visitors)

TABLE 5.6.1

HYPOTHETICAL WEEKDAY
FERRY SYSTEM PATRONAGE, MAXIMUM LOAD
SAUSALITO TERMINAL OPERATIONS

	Existing	Expanded Service Alternatives		
	Service[a]	2 Vessels[b]	2 Vessels[c]	2 Vessels[d]
Number of Ferries	1	2	2	3
Trip Passenger Capacity	575	575-750	575-750	750
Scheduled Arrivals per day @ Terminal	11	15	15	15
(Maximum) Daily Passenger Arrivals	6,325	9,325	10,550	11,250
Scheduled Departures per day @ Terminal	10	15	15	15
(Maximum) Daily Passenger Departures	5,750	9,325	10,550	11,250

---

[a] M. V. Golden Gate Only

[b] M. V. Golden Gate 11 trips, S-165 4 trips

[c] M. V. Golden Gate 4 trips, S-165 11 trips

[d] Full S-165 Service

Sources: GGBHTD
LeBlanc & Company

TABLE 6.6.2

HYPOTHETICAL WEEKEND/HOLIDAY FERRY SYSTEM PATRONAGE, MAXIMUM LOAD SAUSALITO TERMINAL OPERATIONS

	Existing Service[a]	Expanded Service Alternatives Combined Vessels[b]	 S-165 Only
Number of Ferries	1	[redacted] 2	[redacted] 2
Trip Passenger Capacity	575	2,075	2,250
Scheduled Arrivals per day @ Terminal	8	[redacted] 13	[redacted] 13
(Maximum) Daily Passenger Arrivals	4,600	8,350 [redacted]	9,750 [redacted]
Scheduled Departures per day @ Terminal	8	14 [redacted]	14 [redacted]
(Maximum) Daily Passenger Departures	4,600	8,925 [redacted]	10,500 [redacted]

---

[a] M. V. Golden Gate only

[b] M. V. Golden Gate and S-165 service capacities combined

Sources: GGBHTD
LeBlanc & Company

TABLE 5.6.3

POTENTIAL (MAXIMUM) NON-RESIDENT WEEKDAY VISITATION TO SAUSALITO AT VARIOUS FERRY SYSTEM SERVICE LEVELS

	Service Alternatives			
	Existing Service	2 Vessels	2 Vessels	2 [illegible] Vessels
(Maximum) Daily Passenger Arrivals	6,325	9,325	10,550	11,250
Estimated Evening Commuter Arrivals[a]	(460)	(460)	(530)	(600)
Other Daily Visitor Arrivals[b]	(5,865)	(8,865)	(10,020)	(10,650)
Total Daily Visitors to Sausalito - Maximum	6,325	9,325	10,550	11,250

---

[a] At 40 percent of peak hour vessel capacity

[b] Residual capacity

Source: LeBlanc & Company

TABLE 5.6.4

POTENTIAL (MAXIMUM) NON-RESIDENT WEEKEND/HOLIDAY VISITATION TO SAUSALITO AT VARIOUS FERRY SYSTEM SERVICE LEVELS

	Service Alternatives		
	Existing Service	Combined Vessels	S-165 Only
(Maximum) Daily Passenger Arrivals	4,600	8,350 [redacted]	9,750 [redacted]
Estimated Evening Commuter Arrivals[a]	(115)	(115)	(150)
Other Daily Visitor Arrivals[b]	(4,485)	(8,235) [redacted]	(9,600) [redacted]
Total Daily Visitors to Sausalito - Maximum	4,600	8,350 [redacted]	9,750 [redacted]

---

[a] At 10 percent of peak hour vessel capacity

[b] Residual daily capacity

Source: LeBlanc & Company

8,350 - 9,750

The weekend range would total [redacted] visitors (with a pleasure visitor capacity range of [redacted] passengers).

8,235-9600

Differentials between weekday and weekend/holiday levels exist primarily to reflect (1) slightly different trip scheduling, and (2) dropoff in commuter trips on weekends and holidays - thus increasing potential capacity for "other" visitors.

Table 5.6.5. provides a summary of the maximum levels of visitation to Sausalito under the various assumptions.

With respect to other pressures resulting from ferry operations, one certain (and relatively identifiable) aspect is the impact of additional passengers in toto (but especially pleasure visitors) on Sausalito's commercial economy.

In order to attempt an assignment of relative impacts in this category strictly to ferry operations (as opposed to impacts from other sources), we have developed a series of hypothetical cases, whereby visitors to Sausalito bring about measurable changes in the commercial sector.

Since no empirical evidence related to the current impact of Sausalito visitors exists (such as measures of spending at a given point), we have developed a range of expected visitor expenditures in Sausalito illustrated in Table / . This computation utilizes the ranges of maximum weekday and weekend visitation (commuters and all others) previously developed. Total spending is viewed as a function of average purchases per person, per visit.

.6.6.

Further, the Table 5.6.6. calculations show the possible distribution of visitor spending to the categories most likely to receive the benefit of this increased visitation to Sausalito: shopper or comparison goods (apparel stores, jewelry, trinkets, art, etc.); and eating and drinking (fast food, cocktail lounges, restaurants). Some convenience goods spending (drug and food market sales) might be registered, but it would in all probability be a negligible amount.

TABLE 5.6.5

MAXIMUM RANGES OF VISITATION TO SAUSALITO, VARIOUS SYSTEM SCHEDULING AND SERVICE LEVELS

	Probable Daily Visitation Levels[a]	
	Existing Service at Capacity	Expanded Service Alternatives
Weekday Ferry Operations	6,325	9,325 - 11,250
Commuters	(460)	(460) - (600)
All Others	(5,865)	(8,865) - (10,650)
Weekend/Holiday Ferry Operations	4,600	9,850 - 11,250
Commuters	(115)	(115) - (150)
All Others	(4,485)	[redacted] - [redacted] (8,235) - (9,600)

---

[a] From Tables 5.6.3 - 5.6.4.

Source: LeBlanc & Company

TABLE 5.6.5

PROBABLE ANNUAL RETAIL SALES IMPACT OF FERRY SYSTEM OPERATION ON SAUSALITO AT MAXIMUM FERRY PATRONAGE LEVELS

Visitors to Sausalito For Pleasure[a]	Number of Visitors	Annual Spending Per Range of Visitor/Commuter Daily Expenditures $0.50	Annual Spending Per Range of Visitor/Commuter Daily Expenditures $2.50
Retail Purchases[b]	[redacted] 4,305	785,660 $ [redacted]	3,928,310 $ [redacted]
Eating & Drinking	[redacted] 2,870	582,720 [redacted]	2,618,870 [redacted]
Total	[redacted] 7,175	$ [redacted] 1,368,380	$ [redacted] 6,547,180
Commuter Visitation[a]			
Retail Purchases[c]	220	$ 40,150	$ 200,750
Eating & Drinking	140	25,550	127,750
Total	360	$ 65,700	$ 328,500

---

[a] Average low-high daily visitation level, weekdays and weekend/holiday service levels

[b] Primarily comparison/specialty goods

[c] Primarily convenience goods

Source: LeBlanc & Company

Selecting ranges of expenditure per passenger is difficult, particularly since the types of visitors to Sausalito differ so widely (between commuters, young people, families, tourists, others). We are arbitrarily selecting an average expenditure (per visitor) range of $0.50 to $2.50 daily. This would appear to provide for those who spend nothing; those who buy specialty goods while in Sausalito; those who spend much more than the average.

Since at this point we are primarily interested in converting possible visitor purchases to development pressure on Sausalito's commercial structure, the next step is to reflect upon the impact of these levels of visitor expenditures in terms of development potential. Table 5.6.7. provides a conversion of sales volumes from Table 5.6. into square feet of supportable floor area (this calculated at sales per foot performance ratios of a "highly profitable" category).

These space use development potentials would be realized to the extent that Sausalito's current inventory of retail store and restaurant outlets has underutilized sales capacity - an unknown factor. Naturally, if various shops or restaurants in Sausalito could substantially increase sales, development pressure from ferry visitor spending alone might well be absorbed. Assuming, however, that no potential exists in the current inventory (for a maximum development pressure assumption), then a range of support could be generated, by ferry patrons, for 11,000 – 55,000 [redacted] square feet of retail shops and 6000 – 27000 [redacted] feet of eating and drinking space.

Presently, we estimate that Sausalito contains nearly 250,000 square feet of retail comparison goods, eating and drinking and convenience commercial space. The bulk of this (perhaps 150,000 square feet or so) is concentrated in Central Sausalito and in the Caledonia Street commercial zone. Additional shops and stores are located on Bridgeway at the 2nd Street junction (near Richardson) and in North Sausalito near Harbor Drive. Thus, the potential presure for additional visitor-serving commercial space will be substantial (up to 101,490 square feet less underutilized capacity). It is likely that the bulk of developer interest will center on locating such space north of Central Sausalito (in new development projects if approved), due to the lack of space in the older central zone.

It is anticipated that developer interest in this space potential would be focused first on Central Sausalito, and second on the North Waterfront. The creation of this level of space would possibly generate new jobs (for store and restaurant/bar employees) for 60-275 [redacted] persons, primarily in the lower wage-earning brackets (clerks, service workers and related occupations).

TABLE 5.6.7

VISITOR EXPENDITURE LEVELS TRANSLATED INTO SUPPORTABLE FLOOR AREA, MAXIMUM FERRY SYSTEM PATRONAGE

	Estimated Range of Impact[a]		
Visitor Expenditures For Retail Purchases	925,810 $ [redacted]	-	4,129,060 $ [redacted]
Supportable Floor Area (Sqft)	11,010 [redacted]	-	55,050 [redacted]
Visitor Expenditures For Eating & Drinking	608,270 $ [redacted]		2,746,620 $ [redacted]
Supportable Floor Area (Sqft)	6,082 [redacted]		27,470 [redacted]
Total Potential Floor Area Supported (Sqft)	[redacted] 17,092		[redacted] 82,520

---

[a] From Table 5.6.6

Source: LeBlanc & Company

Pressures for office space development arising from expanded ferry service will likely not be significant. Certainly, some interest in a Sausalito office location might emerge, eventually, on the part of smaller professional firms wanting connections to San Francisco - but a Sausalito location. The probability of a massive shift of this type is not high , however. The ferry system will still not offer the maximum "penetration" to San Francisco (as do the Civic Center and Financial District bus routes) for a businessman making an appointment. And - particularly for an office needing daily mobility in Marin County - use of the auto (at off-peak hours) will remain for some time a strong alternative to ferry use. Thus, the commuter-to-San Francisco function should remain for some years the major aspect of GGBHTD ferry operations, with respect to professional and service office locational matters.

EIR SECTION 5.7.0 (POPULATION)

No significant change in Sausalito's resident population is expected to directly arise from expansions of ferry facilities or service. See additional comments in Section 5.8.0 below.

EIR SECTION 5.8.0 (HOUSING)

To return to the types of impact noted above, the first was that of increased pressure for residential locations near or caused by expansion of ferry operations. Our views on this are as follows: first, expansion of commuter capacity at Sausalito could, at some future date, be related to certain increased residential demand in Sausalito and Southern Marin (say as far north as Mill Valley. We believe that ferry riders living, or seeking to live, north of this boundary would choose Larkspur Terminal as their service terminal.) The question, then, is one of the "draw" of the Sausalito Terminal operations as this relates to Sausalito residential patterns. Unfortunately, this question is considerably clouded by (1) transportation modal questions, such as preferences for ferry, auto and GGBHTD bus service at various fares and trip times, and (2) the dynamics of the housing market in Southern Marin.

Presently, although now operating for almost four years, the M. V. Golden Gate carries an average of 400 commuters from Marin to San Francisco, depending on weather, time of year, and other factors. This is roughly 20 percent of capacity at peak hour commute runs (7:15 and 8:25 am, and 4:40-5:30 pm). Thus, the ferry is not "at capacity," and both Sausalito and other Marin commuters are using autos and express buses to travel to and from work (we estimate that some 15 percent of all Sausalito commuters may be using the ferry). It is possible, therefore, that neither existing nor expanded service from Sausalito would draw - in the foreseeable future - sufficient commuters to bring about a dramatic increase in demand for Sausalito homesites.

Even if one accepts dramatically increased ferry commuter patronage in the future (due to increased GG Bridge congestion, bus system scheduling, etc.), would this alone automatically translate into pressure for residential use in Sausalito? It is possible - although housing costs in Sausalito are certain to screen out all but the affluent, smaller households - and there are still less costly alternatives available elsewhere in Southern Marin, within easy reach of the Sausalito Ferry Terminal by feeder bus or auto.

Nonetheless, a full ferry system capacity, with improved scheduling and equipment, a certain percentage of possible commuter patrons might decide to actually reside in Sausalito. This would bring about two conditions: (1) some continuing upward pressure on residential prices and rents for existing units in the vicinity, and (2) other

pressures translating into increased market support for new projects in Sausalito (such as the various waterfront projects).

The strategic location of Sausalito for all transportation alternatives, however, (whether by ferry, bus or auto) makes conclusions related to the ferry terminal's draw strictly speculative. The residential market conditions expressed above could very well arise simply due to Sausalito's location, amenities and character.

Further examination of impacts upon the residential character of Sausalito (such as how many pleasure visitors might relocate to Sausalito) produces equally fascinating, but presently unanswerable, questions.

Limited employment that might be generated by ferry visitors (60-275 [redacted] jobs in total) could, to a degree, stimulate residential demand in Sausalito. However, the relatively modest earnings in service worker categories will keep the bulk of these employees out of the increasingly expensive Sausalito housing market.

It has been pointed out to us that most of the North Waterfront development proposals include residential uses (smaller units, increased densities) that might increase the moderate-income housing stock. This is very unlikely, with housing production prices (and subsequent resale values) rising at annual rates of 12-20 percent, from a base near $50,000 per unit.

EIR SECTION 11.0.0 (GROWTH INDUCING IMPACT)

Additional "growth" or new real estate development in Sausalito will not be purely a function of ferry system facilities and operations. The expanded ferry service possible with the Spaulding (S-165) fleet could, however, produce measurable pressure for expansion of Sausalito's retail commercial activities - and floor area. The actual dimensions of this development pressure are, to a great extent, dependent upon these variables:

- The actual patronage experienced on the ferries each period (it could, for example, be far less than "maximum capacity" even in the summer months).
- The diversion from other travel modes brought about by ferry system expansion (i.e. what percentage of total ferry trips are replacing auto and bus trips).
- The ability of existing Sausalito retail and service outlets to increase sales performance (unknown) and thus absorb new purchasing power.
- The actual outlays for goods and services by larger ferry patronage (yet to be tested).

Further, other pressures for development exist in Sausalito over and beyond the impact of visitors to the area. Waterfront and other property owners seek "highest use" of their holdings; developers need projects to develop, builders to build. With Southern Marin in the grip of an "anti-growth" movement, some investors will view reuse of Sausalito properties as an alternative.

Thus, expansion of the Sausalito Ferry Terminal, and provision of additional ferry capacity will not - in all likelihood - lead the pressures upon Sausalito's economy. Full utilization of an expanded system, however, if it occurs, will add (to some degree) to a reinforcing of Sausalito as a visitor destination area.

CREDITS

SPONSOR

Golden Gate Bridge, Highway and Transportation District

CONSULTANTS

Wilsey & Ham
Foster City, California

PROJECT STAFF

Felix Warburg, AIA, AIP	Program Director
Michael Rice, Associate AIP	Project Coordinator
Don Fry, Associate AIP	City and Regional Planner
Jack Stowers	Urban Planner
Joe Eng	Transportation Planner
R. Jerome Esmay	Environmental Engineer
Gerrie Baird	Graphics
Sharon Buckman	Report Production
Linda Savage	Report Production

ASSOCIATED CONSULTANTS

Cooper-Clark & Associates Palo Alto, California	Geology/Soils
LeBlanc & Company San Francisco, California	Economics
Dr. H. T. Harvey & Dr. J. P. Heath California State University San Jose, California	Biology
Dr. Albert Miller Professor of Meterology California State University San Jose, California	Climate and Air Quality